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## Spring Peeper Meadow



*Photo by Jason Boudreau-Landis*

### Location & Hours

[107 W 82nd St, Chaska, MN 55318](#)

There is parking available in a small, gravel lot by the entrance to the trail off 82nd Street.

Spring Peeper Meadow is a part of the Arboretum, but it is outside the main grounds and admission is not charged here. The Spring Peeper Meadow is open seasonally during regular [Arboretum grounds hours](#).

Spring Peeper Meadow is a great place for observing and learning about nature. The .7 mile trail swings through the prairie, down into the wet meadow and across the marsh on a broad boardwalk. It then contours along the hillside up to the Gallistel Overlook with views over the marsh. The trail continues to the north boardwalk and onto the Oak Knoll before leading

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visitors through a small remnant maple basswood forest. The loop continues through tallgrass prairie before returning to the start. Along the way, there are 12 interpretive signs that provide insight into the significance of this wetland restoration. Estimated walking time is 60-90 minutes.

The Spring Peeper Meadow is open in all seasons! Birdwatching is excellent in the spring with migrating birds. In late spring and early summer, families of ducks can be spotted swimming among the bur reeds. In summer the wildflowers are a photographer's delight. Hike the trails year-round, but don't miss the fall colors in the prairie and the forest that surrounds the meadow. A groomed ski trail loops through the meadow for a pleasant winter experience.

[Read about an experience at Spring Peeper Meadow >](#)

## Meadow Restoration Project

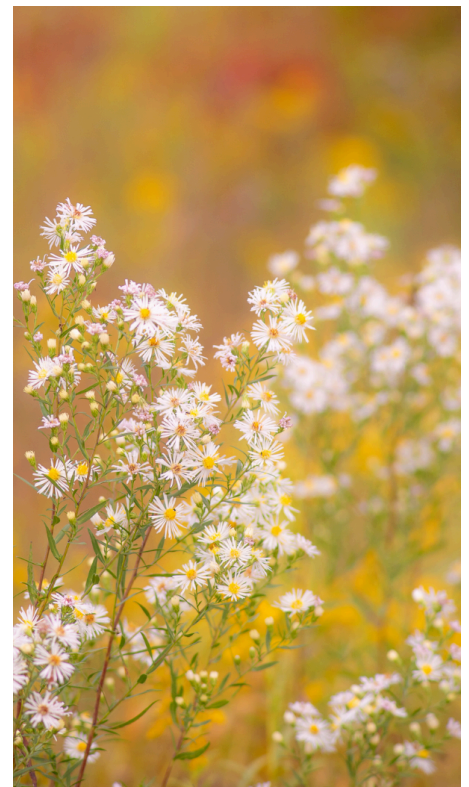
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### ✕ Wetlands Restoration Project Overview

The Arboretum's Spring Peeper Meadow Wetlands Restoration Project (SPM) is bringing back to life a sedge meadow as it develops model prairie wetlands restoration landscapes. Originally slated to become an industrial park, Spring Peeper Meadow was acquired by the Arboretum in 1995. The 30-acre project is the country's first restoration of a sedge meadow on a tiled cornfield.

Because restoring a wetland is an incredibly long process, long-term data for inland wetlands simply doesn't exist. Dr. Sue Galatowitsch and her team are working to change that as they gather data on everything from birds and amphibians to soil chemistry and temperature.

A site for cutting-edge data collection, SPM is also a groundbreaking project designed to demonstrate techniques used to effectively restore biodiversity in urban wetlands. Private and public agencies from around



*Photo by Jason Boudreau-Landis*



the country can turn to SPM for a model they can replicate in their own communities.

## ✕ History & Funding

The site that is now Spring Peeper Meadow (SPM) had been a shallow seasonal wetland set amidst the Big Woods of Minnesota. It was part of a wooded rolling landscape formed by the receding glaciers. The forests were composed of maple, basswood, oak and ash. The wetlands in the low lying areas supported diverse communities of sedges, rushes, grasses and wildflowers. This was before the forest was cut down to make way for agriculture and before the wetland at the bottom of the slope was drained to improve the field for crop production. The site was first farmed in the late 1800's after the wetland was ditched to remove the water. In 1927, the Wrase family first tiled the field to further improve its capacity to grow crops. In 1957 the field was retiled when the old tile began to fill with sediment and became clogged. The farm was productive, growing corn, soybeans and finally hay crops until the land was purchased by the Minnesota Landscape Arboretum in 1995. The Minnesota Landscape Arboretum Foundation and the Legislative Commission on Minnesota Resources (LCMR) provided the funding to purchase the 30 acres of land in the corner of Hwy 41 and 82<sup>nd</sup> Street on the southeast edge of the Arboretum, thus saving it from commercial development.

In 2007 Spring Peeper Meadow celebrated 10 years of restoration. The underground tiles that had drained the meadow for decades were broken in October 1996, allowing water to remain on the land that had supported agriculture for so many years. Spring Peeper Meadow resumed its history as a sedge meadow with the restoration of its plant community and its first growing season beginning in April 1997. That spring, the seeds of

115 different native wildflowers, grasses, and sedges began to germinate in the saturated soil. It seems that land that was not so long ago a corn field is exceptionally rich just 10 short years later. The first 10 years of the restoration were dramatic as the plant community established and wildlife returned to the meadow. The patterned rows of corn had finally given way to irregular patches of lake sedge and a seasonally changing palette of wildflowers blooming in bright clumps and colorful bands around the perimeter of the meadow.

During the first 11 years we documented the establishment of the plant community as well as the arrival and nesting of habitat specific birds, the mating of amphibians, and the return of invertebrate populations. In 1997 leeches appeared in the recently flooded farm field even before the wetland seeds had germinated. Elusive sora rails began building their floating nests in the emergent vegetation in 1999. School children discovered that fingernail clams had become established while dipping for aquatic insects in 2000. In 2002, the elegant white candelabras of Culver's root and the bright yellow bundles of tufted loosestrife flowers were found blooming in the meadow for the first time. Tiny bulbs of Michigan lilies that were planted in the meadow in 1999 were finally strong enough to produce their lovely reflexed orange flowers in 2004. The population of wood frogs has continued to increase over time, until they were heard chorusing around the entire perimeter of the wetland in 2006. In 2008 a quartet of buffleheads were seen for the first time on the wetland. The three drakes were stunning with their white crests raised. The males and one hen would dive briefly only to pop back up to the surface like bobbers.

We will continue to observe and document any new occurrences at Spring Peeper Meadow and will revel in the ever changing character of the meadow. In addition to casual observations, staff will periodically conduct more rigorous data collection in order to quantify changes seen in the plant community and its inhabitants.

## Funding

Funding for the Spring Peeper Meadow restoration was provided by the Minnehaha Creek Watershed District (MCWD) and the Minnesota Environment and Natural Resources Trust Fund through the Legislative Commission on Minnesota Resources (formerly LCMR, now LCCMR). Additional funding was provided by the Minnesota Landscape Arboretum Foundation, The Hubbard Foundation, Carolyn Foundation, the Albert Gallistel Memorial, Conservation Partners Grant (MNDNR), Community Roadside Landscape Partnership Grant (MNDOT), The Minnetonka Garden Club, Wally and Mary Lee Dayton, and several individuals.

### ✕ Restoration Goals

Spring Peeper Meadow (SPM) is named after a diminutive tree frog that would have inhabited the forested wetlands in this area many years ago. Although there are no spring peepers in Spring Peeper Meadow, the goal of the restoration team was to establish a diverse wetland plant community in the basin and upland plant communities that could ultimately support spring peepers.

A computer model guided the team in determining the type of wetland that would establish based on the hydrology of the watershed. The model predicted that the wetland would probably be a seasonal wetland such as a sedge meadow. The establishment of the native plant communities on the uplands was a secondary goal that would take place after the wetland was restored. These objectives were given life in a concept plan for the site that would guide the restoration process *Link to Concept Plan Diagram*.



### ✕ Restoration Process

## **Managing Reed Canary Grass**

In 1995, when the land was purchased, the upland fields around the basin were in corn production and reed canary grass was growing in a nearly monotypic stand in the basin. Reed canary grass is an invasive grass that exploits moist habitats due to its highly competitive growth habit and prolific seed production. The first task for restoration was to eliminate the reed canary grass to make way for a diverse native wetland plant community. Periodically in 1995 and 1996 RoundUp was applied to the reed canary grass. After two seasons of managing the reed canary grass, the site was ready for the reintroduction of the seeds and plants of native wetland species.

## **Breaking Tile and Seeding**

Because Spring Peeper Meadow (SPM) had been cultivated for so many decades, the seeds of the desired native wetland plants would have to be reintroduced. The seeds of 115 species of grasses, sedges, and wildflowers had been hand collected by Arboretum staff and volunteers in 1995 and 1996. Permits to collect seed from local wetlands had been obtained from county, state, and federal agencies as well as from private individuals. These native wetlands were primarily within a 60 mile radius of the Arboretum. The seed was stored in a large cooler until the site was ready. Some of the seed was used to produce plants in the greenhouse and in a field nursery that would then be planted into the wetland in the spring of 1997.

In October 1996 a backhoe was used to tear up portions of the tile that had been draining the wetland for so many decades. Impervious sections of tile were installed on the ends of the remaining drain tile within the field and inline stoplogs were installed to allow staff to manage the water level. After the tile was broken, the seed was broadcast on the field in three batches of different species in three

distinct elevation bands. Sowing the seed in the fall allowed the winter cold to naturally stratify the seed and promote germination in the spring. In November 1996 a heavy rain on frozen ground refilled the basin for the first time since the late 1800's.

## **Planting the Meadow**

In April 1997 eleven Arboretum staff faced the bare brown mud surrounding the dreary pool of water with buckets of sedge seedlings and trowels in hand. Spring Peeper Meadow was on the cusp of a transformation. The wetland had been divided into six sections. In order to compare the efficacy of planting versus seeding as restoration techniques, three of the sections were going to be planted in addition to the seeding that had occurred in the fall. The remaining three sections had been seeded, but would not be planted. More than 67,000 seedlings and transplants were systematically planted in the three sections. The seedlings and transplants were primarily sedges which were thought to establish more conservatively from seed. A few thousand of the seedlings were grasses or showy wildflowers such as blue flag iris and marsh marigold. The planting was completed in June 1997. By then the seeds were beginning to germinate and the meadow was transforming into a lush green gem.

## **Maintaining Spring Peeper Meadow**

Some of the seeds that germinated in the spring of 1997 were seeds that were already in the soil prior to reintroducing the native wetland seed. They included many annual agricultural weeds and reed canary grass. The SPM team knew that to successfully achieve their goal of a diverse sedge meadow, they would need to continue to aggressively manage the reed canary grass as it germinated from seeds stored in the soil seed bank. In 1997 seedlings of reed canary grass were hand weeded by the eleven staff members. They crawled along examining the plant community for the invasive grass

and dug it out with trowels. They were teased with the title "weeder geese" by Arboretum director Peter Olin. Cattail seedlings were also prolific in the open water of the young wetland. In hip waders, the team plowed through the water pulling out cattails so that they would not overwhelm the native community.

In subsequent years reed canary grass and cattails have been monitored and managed as needed. As the native plant community continued to get more established and began to shade the ground more, the risk of invasion was reduced and the level of management effort has decreased accordingly. There will be a need for continued monitoring in the restoration in order to prevent reed canary grass from establishing.

## ✕ Site Analysis & Planting Plan

### **Hydrology**

A TR 55 hydrologic model predicted that the restored maximum water depth in SPM would range between 6 and 12 inches and that standing water would not be permanent. The watershed of SPM is 54 acres.

Historically SPM was shallow depressional wetland with a natural surface outlet that drained to the south into the Chaska Ravine and ultimately to the Minnesota River. The construction of 82<sup>nd</sup> Street in the 1950's blocked that natural drainage pathway. The wetland was ditched in the late 1800's, tiled in 1927, and re-tiled in 1957. The tile lines have been blocked to restore the hydrology of the basin.

### **Soils**

Soils in the basin are Houghton and Muskego muck soils with adjoining Glencoe silty clay loam. The surrounding upland soils are of the Lester Kilkenny series.

### **Planting Plan**



Given the hydrology data and the profile of the wetland basin, it was determined that three wetland vegetation zones would become established at SPM. Below the 987 ft contour, emergent vegetation would establish. Between 987 ft and 988 ft, sedge meadow vegetation would establish. Between 988 ft and 990 ft, the high water table and moist soils would support wet prairie vegetation. Colored poles mark these elevation zones on the ground and these poles were used when the seed was broadcast to place each suite of plants at the appropriate elevation. The entire wetland was seeded. Then in order to compare the efficacy of seeding alone versus seeding supplemented by planting, we divided the wetland into 6 sections. The sedge meadow and emergent zones of three of the sections were planted in addition to the seeding. Over 60,000 sedges were planted. [Check out the Published Papers to learn more.](#)

## ✕ Research

A comprehensive round of data collection will be conducted periodically in order to monitor the establishment of the wetland community. Specific areas of research interest include plant community establishment, seed bank establishment, amphibian population trends, and breeding bird utilization of the habitat. Data regarding hydrology, soil chemistry, and water chemistry are collected to support the other studies. Data analysis will help reveal patterns in the establishment and function of the wetland community. In addition, the students from a local middle school annually conduct monarch butterfly studies at Spring Peeper Meadow.

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## Sights & Sounds of Spring Peeper



Below are just a few of the things you can expect to see and hear during your visit to Spring Peeper Meadow.



## Wildlife

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### + Mammals

Many species of mammals live in or pass through SPM, including whitetail deer, coyote, red fox, gray squirrels, red squirrels, chipmunks, opossum, raccoon, mink, weasel, muskrats, cottontail rabbit, meadow voles, shrews, pocket gophers, woodchucks, deer mice, and bats. Although you may not encounter mammals, if you know where to look, you can usually find some sign of their presence. Raccoon and muskrat tracks can often be found in the mud. The muddy tracks of the raccoons are also found on the boardwalk which they use as they forage at night. The grassy nests of meadow voles may be found amongst the sedges. Muskrat lodges appear as if from nowhere each fall out in the wetland. Plant stems bitten off and floating on the water are a sign that muskrats have been browsing. Whitetail bucks rub their antlers on young trees of

## Habitats

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### + Emergent Marsh and Sedge Meadow

The wetland is the heart of the Spring Peeper Meadow restoration. Initially it was determined that the water level in the wetland would only be deep enough to support a sedge meadow or Type II wetland. However, the model that was used failed to account for ground water contribution to the wetland. A shallow emergent marsh holds more water for a more sustained time during the growing season than a sedge meadow. During dry years these somewhat deeper wetlands are still prone to dry down and the plants that grow there are adapted to water levels that fluctuate between flooded and merely saturated.

Restored in 1996-97, the wetland is now well established, yet the plant community continues to evolve as some species expand either by seeds or by rhizomes and others disappear.

a suitable diameter, leaving the tree shredded and broken. Look for coyote and fox scat on the trails that they travel for ease much as we do. Hair in the scat and its pointed ends help us distinguish coyote scat from the scat of other mammals. Large holes burrowed into the hillside may be woodchuck dens. In winter tracks abound. Tracks of the hunters and the hunted tell stories in the snow. Rabbit fur on the snow is a sure sign that owls or coyotes have fed recently. Small paired footprints leading from one tuft of grass and disappearing into another tuft tell the story of the vole that lived another day.

#### + Birds

Spring Peeper Meadow is a great place for birdwatching! To date more than 90 species of birds have been observed at SPM. In spring the meadow and woods come alive with the activities of birds that may be passing through or staying to nest. Many bird species are habitat specialists and many other species are habitat generalists. Most habitat generalists are common birds that we are familiar with because they are easy to please for their nesting and foraging requirements. The habitat specialists are birds that need specific habitats for their nesting and food needs. At SPM, we have attracted a few species that are habitat specialists and that has been a notable accomplishment because it tells us that we have succeeded in achieving some of our restoration goals. Sora rails and Virginia rails are two such species. Both

Vegetation surveys in 2000 and 2004 demonstrate that the goal of achieving a diverse wetland plant community had been reached.

One of the dominant plant types in a shallow marsh or sedge meadow are sedges (*Carex* species) Sedges are grass-like plants with three-sided stems and unique fruiting structures. Twenty different species of sedges were introduced to SPM. You can readily find the four most common species which are lake sedge, slough sedge, porcupine sedge, and awl-sedge. Several of the remaining species are less common and a few species did not become established. There are several other distinctive plants in the marsh and meadow. At the lowest elevations where the water is deepest you can find water plantain, arrowhead, softstem bulrush, sweetflag and burreed. All of these are very common in the wetland. The dominant grass around the perimeter of the wetland is Canada blue-joint grass. It is easy to identify by its fine texture and narrow leaf blades. There are many wildflowers blooming profusely around the wetland starting in April and May with marsh marigolds, golden alexanders and Canada anemone and ending in September and October with sneezeweed, bottle gentian and several species of asters.

#### + Big Woods Forest

Remnants of the Big Woods forest can be found scattered throughout the

are secretive wetland species that build their nests over the water on the stems of emergent plants. In the spring you can hear them calling amongst the emergent plants.

#### + Amphibians

Minnesota habitats support 14 species of frogs and toads. Six of those species can be found at SPM. The best time to find frogs and toads at SPM is in the spring when they emerge from hibernation and converge on the wetland to mate and lay eggs. Western chorus frogs and wood frogs are the first two species to emerge each spring, often as early as late March. Even before all the snow has melted, they may be singing in the wetland. The wood frog's mating period is relatively short, lasting only a couple weeks. The western chorus frogs continue to sing for another few weeks, and they are soon joined by Cope's gray tree frogs, northern leopard frogs and American toads. After they mate many of the frogs will leave the wetland for the upland around it to feed for the summer. However, the green frog can be heard calling with a guttural "gung gung" call from near a tuft of vegetation out in the wetland well into summer. In mid to late summer, plump green tree frogs can be found basking in the sun on a leaf blade along the boardwalk. Wood frogs can be seen in the windbreak where their skin color changes to match the rust orange color of the fallen pine needles. When the wetland dries down, as it has in four years out of eleven, leopard and green

Arboretum. Most of the remnants have been disturbed by human activities, particularly fragmentation, or the cutting down of the forests leaving only small areas intact. A four acre parcel remains at SPM. The canopy of mature trees includes sugar maple, basswood, red oak, and bitternut hickory. As with many forests in Minnesota, this parcel is impacted not only by its small size, but also by pressure from deer browsing, earthworm invasion and buckthorn invasion. Some of the effects of these impacts include the loss of the leaf litter on the forest floor and the subsequent loss of the woodland wildflowers that would have carpeted the forest in spring. Tree seedlings also have difficulty establishing in these impacted forests. None-the-less, stepping into the woods at any time of the year is like walking into a room that is freshly painted each season; cool and peaceful in summer greenery, dazzling in golden fall color, and brilliantly stark in winter white. In spring look for the ephemeral wildflowers which have been transplanted into the forest floor in an attempt to restore the spring wildflower population. Many of these wildflowers were salvaged from a site near Mankato that was scheduled for development, while others reappeared after the removal of buckthorn.

In 1999 a forest restoration was planted on the eastern edge of SPM. The slopes around the wetland would have been forested prior to European settlement, so it was determined to reforest the upper slopes. Sixteen species of trees

frogs can be spotted on the exposed mud. The small size of western chorus frogs and their cryptic mud coloring makes them very difficult to spot. Someday the quick movement of a very small creature that you see out the corner of your eye may be the brown-striped chorus frog.

#### + Insects and Other Invertebrates

Spring Peeper Meadow is a rich environment for invertebrates both aquatic and terrestrial: insects, arthropods, arachnids, crustaceans, mollusks. The diversity of invertebrates at SPM is many times greater than the diversity of all the other animal groups put together. Unfortunately our only observations of the invertebrates have been very informal, but the joy of studying the smallest of creatures is that you can find them almost anywhere you look. Lean over the boardwalk and you will soon observe water striders dimpling the surface. Focus your eyes to see into the water column. Water boatmen, water mites, damsel fly larvae, water fleas will all become apparent. Pick any plant and study it. You will be amazed at the diversity of life that a single plant supports. Crickets, caterpillars, weevils, dragonflies, butterflies, bees, and moths are just the obvious insects; many other tiny insects occupy their own unique niche on the plants and in the soil.

and shrubs were planted to incorporate diversity into the planting. The trees were planted close together to promote quick canopy closure. This "Dense Initial Planting Strategy" will help to create forest-like conditions sooner. Eventually some trees may have to be culled if survival is high. Native grasses were planted beneath the trees as a ground cover. Eventually, as the trees mature and create more shade, the ground layer will be transitioned from prairie grasses that require sunlight, to shade-loving forest species.

#### + Tallgrass Prairie

Tallgrass prairie was planted around the wetland on the lower slopes to help prevent soil erosion. Historically it was typical in this region of Minnesota to have pockets of prairie amongst the Big Woods. The moist soils of central Minnesota support tall species of grasses such as big bluestem, Indiangrass, and switchgrass. The warm rust colors of the native grasses are distinctive in autumn. Many wildflowers brighten the prairie landscape in summer. The spring flowers tend to be shorter. As the grasses grow from spring into summer, the height of the wildflowers that are blooming matches them so that their flowers are displayed where the pollinating insects can readily find them. Prairie smoke and alumroot are examples of spring blooming species commonly found in the prairie. Common ox-eye and black-eyed Susan bring in summer. Prairie blazingstar, giant blue hyssop, wild

lavender bergamot, and gray-headed coneflower bloom in the peak of summer. By fall, the asters and goldenrods dominate the prairie flora.

## + Savanna

Savanna is a fire maintained plant community. In this region, oak savannas occurred in areas where fire periodically swept through. Typically it was the thick-barked fire resistant bur oaks that became established in prairies when there was a long enough gap between fires. Prairies dotted with trees are called savannas. These park-like habitats are uncommon today because the fires that maintained them were stopped as the human population and our homes increased in number. Without fire, trees filled in between the large oaks and woodlands became established.

In the northwest corner of SPM, there is a small hill dotted with large oaks with wide spreading branches. The hill is called the Oak Knoll. The large oaks growing there established without competition. Forest trees with plenty of close competition have to grow straight up to reach sunlight. The oak trees on the knoll had room to reach their limbs in all directions equally. They are magnificent trees.

In 1997 the oaks were surrounded by dense thickets of buckthorn. A big effort was made to remove the buckthorn, first using chainsaws to cut down the large fruiting trees, then using shovels and

weed wrenches to dig out or pull the smaller trees and seedlings. In the spaces where buckthorn was removed, native grasses were seeded to restore the savanna grasses. A couple years after the removal of the competitive buckthorn, wildflowers sprang up as if from nowhere. Wild geranium, wood anemone, and bloodroot had been suppressed by the buckthorn, but now bloom with abandon beneath the oaks!

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The Minnesota Landscape Arboretum serves as a research center and extension of the University of Minnesota's College of Food, Agricultural and Natural Resource Sciences (CFANS).

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