

# Iowa Native Plant Society Newsletter

August 1996

Vol. 2, No.3

## Annual Meeting and Doolittle Prairie Field Trip August 24th

The Society's Annual Meeting will be held on August 24th at McFarland Park just north of Ames. Christine has included some of the topics to be covered in the business meeting in her "Greetings..." (page 2). Several of these are important issues relating to our organizational status and by-laws that will determine the future course of the Society. Your attendance and input are important, so please try to attend!

The Society currently has no logo, and we need your help! Bring (or send to Deb Lewis in time for the Annual Meeting) your artwork or idea for the Logo Contest at the Annual Meeting. The entries will be judged by all members present during the lunch time. If you win, you can choose between free membership for 1997 or a free T-shirt with your design on it!

### Schedule for INPS annual meeting:

**9 a.m. - Social hour/continental breakfast  
(coffee, juice and rolls provided)**

**10 a.m. - noon - Business meeting**

**Noon - 1 PM - Lunch (bring a sack lunch)  
and Logo Contest**

**1 p.m. - Travel to Doolittle Prairie State  
Preserve for the field trip**

The field trip is sponsored jointly by the Society and the Central Iowa Prairie Network. Lloyd Crim, who has led IPN field trips to Doolittle for several years, will show us the prairie. Doolittle is one of the premier prairie pothole complexes in the state, and contains a high diversity of wet prairie and wetland plant species. Participants will be able to wade through potholes and observe vegetation zonation patterns firsthand. Purple blazing stars (*Liatris pycnostachya*) are abundant and should be at their colorful best by this time. Be prepared to get wet to experience the prairie potholes, and BRING INSECT REPELLENT. An article by Paul Wetzel, an ISU graduate student, describes the dynamics of prairie potholes such as those at Doolittle Preserve. Paul's article begins on page 6.

### In this issue

Annual Meeting Notice	1
Greetings Fellow Plant Enthusiasts	2
Preserve Board Meeting/DNR Foray	2
On the Horizon (INPS events)	3
Freda Haffner Kettlehole State Preserve	3
INPS Field Trips Reports	4
In a Nutshell (related activities)	4
The Dynamic Ecology of Prairie Pothole Wetlands.	6
Forms and survey	9
Silky Prairie Clover	back cover

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## G tin Fellow Plant Enthusiasts

Things have really been growing well for us this summer. I can't believe it's been almost a year since Fort Dodge. Already it is time to get ready for our first INPS annual meeting! Here is a preview of most of what we'll cover during the "business" portion of our meeting.

**Elections.** Please use the nomination form in this newsletter to let us know who you think would be good officers for 1997 (including yourself). Send it to Bill Thomas (or give him a call if time is running short) before the meeting, if possible, so we can gain the consent of the nominees. You may bring nominations to the meeting if you have asked and the nominees have agreed to run.

**Approval of By-laws.** The organization committee will bring copies of the by-laws for you to read so that we can have a final vote on them. We should also have our Articles of Incorporation available for comment.

**Committee reports.** We **Will** report on what we have accomplished this year, and make suggestions for what to work on next. We will have sign-up sheets for those interested in working with each of the committees, you're welcome to join one if you haven't yet had the chance.

**Presentation of Charter Member certificates** to all who have paid 1996 dues.

**Appointment of "at-large" representatives.** As now written, our by-laws provide for representatives at-large. These are people who can give us more detailed information about possible field trip sites in their area, help organize and publicize planned trips thereabouts, and in general promote INPS where they live. They could do this by attending or sending information to the Program Committee meeting, lining up trip leaders or hosts, etc. This is a good way to balance our leadership, and keep informed on possible projects throughout the state.

Do think about how you can share your talents in INPS, whether by serving as an officer or at-large representative, working with a committee, leading/helping with field trips, publicizing our group at other events, or organizing one of the many other possible projects. I am looking forward to seeing your faces again, and hearing your suggestions and ideas for next year.

*Christine Kirpes, President*

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### State Preserves Advisory Board Meeting and DNR Foray in Dickinson Co. September 5th - 8th

The Iowa Department of Natural Resources have planned their annual foray to coincide with our Saturday field trips to Freda Haffner State Preserve. The State Preserves Advisory Board will meet at 1 p.m., Thursday Sept. 8th, at Gull Point State Park just east of Iowa Highway 86 north of Milford. The meeting is open to the public, and input on acquisition and management of state preserves is encouraged. The DNR foray will begin Friday morning; the foray headquarters will be Iowa Lakeside Lab (north of Milford on Hwy. 86). The foray provides an opportunity to observe or participate in a coordinated effort by Iowa's natural historians to study and inventory an area; everyone, regardless of level of experience, is invited to join in.

Lodging, as with our field trip, is being arranged at Iowa Lakeside Laboratory. Contact Daryl Howell (515-281-8524) or John Pearson (515-281-3891) for more information.

# On the Horizon...INPS Events

## Logo Contest - August 24th

In conjunction with the annual meeting, members will have the opportunity to decide on the image they wish to use to convey the goals and purposes of the Iowa Native Plant Society. Get out your pens and pencils, or just come up with a good image for a logo. Bring your ideas to the annual meeting in whatever form is convenient. Discussion and voting will be during the luncheon break.

## Field Trip to Excelsior Fen and Freda Haffner Kettlehole (Dickinson Co.) - September 7th

Iowa native Scott Zager of the Minnesota Department of Natural Resources will lead participants in Excelsior Fen, one of Iowa's rarest wetland communities. Possible fen specialties to be seen are lesser fringed gentian (*Gentianopsis procera*), Riddell's goldenrod (*Solidago riddellii*), two species of arrow grass (*Triglochin* spp.) and grass-of-Parnassus (*Parnassia glauca*).

Ed Freese and Nancy Slife will lead us through Freda Haffner Kettlehole. The landform feature known as a "kettle" developed from the melting of a large block of glacial ice which lodged there during the waning stages of the most recent glaciation. Ed is coauthor of the published Flora of Freda Haffner Kettlehole (Proc. Iowa Acad. Sci. 99:23-33, 1991) and, to further whet our appetite, has written an article about Freda Haffner Kettlehole Preserve which begins in the next column.

For those able to stay later in the day (see lodging information, below), Ann Kimber, aquatic plant specialist, will lead a canoe trip along the shore of Lake Okoboji to observe the aquatic vegetation (we may see wildcelery or eelgrass (*Vallisneria americana*), which she told us about in the Feb. 1996 issue of the Newsletter).

Participants in the field trips should meet at IOAM at Iowa Lakeside Laboratory, north of Milford on the east side of Highway 86.

Lodging is available for Fri. night, Sept. 6th and/or Sat. night, Sept. 7th at Iowa Lakeside Laboratory. The cost is \$10/night per person for a rustic cabin and shared bath facilities, or \$15/night per person for air-conditioned accommodations with a private bath. Bring your own linens or pay a small additional charge for sheets/towels etc. While payment can be made on site, we must let the Lakeside staff know by August 30th how many to expect. Please fill out the form found elsewhere in the Newsletter and send it to Deb Lewis, call her (515-294-9499) or let her know at the Annual Meeting if you want to stay overnight.

August 1996

## Field trip to White Pine Hollow State Preserve (Dubuque County) - October 12th

Enjoy an autumn hike through one of Iowa's most beautiful woodlands, and see Iowa's largest stand of native white pine. The terrain here is varied, with numerous rock outcrops, deep ravines and steep bluffs. Although oak-maple woodland is the dominant vegetation type, cool north-facing talus slopes provide habitat for a variety of rare and unusual plants such as moschatel (*Adoxa moschatellina*), golden saxifrage (*Chrysosplenium iowense*), and northern monkshood (*Aconitum noveboracense*), as well as several moss species much more typical of northern habitats. John Pleasants, a plant ecologist at Iowa State University who has just completed a major study of White Pine Hollow for the Iowa State Preserves Board, will be our tour guide during this excursion. He will discuss some of the questions that arose from that study, such as why the oak forest and pine trees are being replaced by maples.

Participants should meet at IOAM at Holy Trinity Catholic Church in Luxemburg. Be prepared for rugged walking conditions.

## Freda Haffner Kettlehole State Preserve

*submitted by Ed L. Freese*

Arend's Kettlehole, in Freda Haffner State Preserve, represents the most recent chapter of Iowa's prairie history. Biologists and geologists have been unraveling the story of its origin and ecology for many years.

The Iowa Chapter of the Nature Conservancy purchased the 110-acre preserve in Section 33, Lakeville Township, Dickinson County on 24 August 1972. The late Freda Haffner of Burlington generously bequeathed funds for such a project at the time of her death in 1969. The site was dedicated as a state preserve on 28 December 1976.

This unique glacial landform in the Great Lakes Region of northwestern Iowa is considered to be one of the largest of its kind. Arend's Kettlehole is about 12.4 acres in size with an approximately quarter-acre pond and marsh at its center. The total watershed for the kettle is 73 acres. The highest point on the kettle rim is 1,465 feet above sea level. The surface of the pond is at 1,400 feet. Widest rim-to-rim distance is 1,065 feet and the narrowest is 594 feet. Kettle slopes are steep (30 to 45 degrees) and the basin is roughly kidney shaped.

This big kettle is located on the edge of the east bank of the Little Sioux River. The valley at this point is broadly u-shaped. The river apparently carried glacial meltwater under both the Altamont and Bemis ice sheets (13,000 and 14,000 years ago, respectively) of the Cary glaciation lobe, leaving behind many eskers. End moraines for both ice sheets can be found only about one or two miles away.

*Continued on page 5*

## Field Trip Highlights: Greiner Family Preserve and Wildcat Den State Park

*submitted by Deb Lewis*

On a warm and pleasant day 17 members met for our June field trip and "botanized" at two wonderful natural areas in Muscatine County. Jim Scott, Louise MacEachern, and Toni Hesseltine showed us many special and rare plants at Greiner Family Preserve, including two rare orchids, Loesel's (or bog) twayblade (*Liparis loeselii*) and tubercled orchid (*Platanthera jlava*), and meadow beauty (*Rhexia virginica*), an endangered species in Iowa. These three were in the scattered fens on the preserve. Meadow beauty blooms later in the summer, but it didn't take us long to spot it because of its interesting prominent, curved venation. Other exciting finds were large-flowered beardtongue (*Penstemon grandijlorus*), sand milkweed (*Asclepias amplexicaulis*), and prairie larkspur (*Delphinium virescens*) on the restored prairie; eastern prickly pear (*Opuntia humifusa*) in a woodland opening; wafer ash (*Ptelea trifoliata*) and a log with a large colony of coral fungus fruiting bodies in the woodland; hairy puccoon (*Lithospermum caroliniense*) on a dry hillside; and sundrops (*Oenothera pilosella*) and blue flag (*Iris virginica*) coloring a bog around a small pond.

We enjoyed a late lunch in the shade at Wildcat Den State Park, where fern-enthusiast Bob Bryant met us. We were awed by the beauty of the sandstone canyon (again contradicting the tourists' complaint that Iowa is flat and featureless)! I was introduced to my second new milkweed of the day, poke milkweed (*Asclepias exaltata*), which is rare in the state except on the Paleozoic Plateau in northeast Iowa. We also saw some species much more common in the southeastern U.S. that barely get into Iowa, like pokeweed (*Phytolacca americana*) and Christmas fern (*Polystichum achrostichoides*). Our count of ferns for the day tallied to 10, with marsh fern (*Thelypteris palustris*) creating identification problems because of its occurrence in the forest (we had seen it earlier in the day in its more typical habitat in the fens at Greiner Family Preserve).

Jim, Louise and Toni did a wonderful job of choosing two contrasting areas and "showing them off" - thanks! After 12+ years in Iowa, I am still amazed by finding ever more diverse and more scenic natural areas, like these two Muscatine Co. sites.

### Waubonsie State Park

The seven of us who gathered at Waubonsie State Park decided to cancel the field trip because of the heavy rain and threat of thunderstorms. Perhaps Dr. Tiffany and Dr. Knaphus can be persuaded to lead one for us next year.

### New Kurtz book released

Many of Iowa's natural areas are described and photographed in a new book by INPS member Carl Kurtz: *Iowa's Wild Places: An Exploration*, published by Iowa State University Press, Ames. I haven't seen it yet, but it has been highly praised in reviews!

## In a nutshell...

1996 Activities of Interest to Plant Enthusiasts

IPN=Iowa Prairie Network; contact person indicated

TNC=The Nature Conservancy; call (515) 244-5044

DNR=Dept. of Natl. Res; John Pearson, (515) 281-3891

August 13, 8:30 p.m., Ames High Prairie, Night Sounds of the Prairie led by Ken Shaw, Pat Galliard, and Rod Dalager, TNC. (Story Co.)

August 17, 9:30 a.m., Lee Zimmer Prairie Pasture, meet at the Floyd City Park on Hwy. 218 in Floyd, contact: Lee Zimmer, (515) 398-2277. (Floyd Co.)

August 17, 10 a.m., Freda Haffner Kettlehole and Silver Lake Fen, TNC. (Dickinson Co.)

August 17.18, Wiegert Prairie Farmstead Festival, near Palmer, contact: Bradley Block, (712) 335-4395.

August 20, 6:30 p.m., Buckner Cemetery, meet at Eldora Welcome Center, IPN, call: (515) 858-3878. (Hardin Co.)

August 24, 9 a.m., INPS Annual Meeting, and Field Trip

August 24, 10 a.m., Sioux City Prairie Wildflowers led by Dianne Blankenship, TNC. (Woodbury Co.)

September 7, 10 a.m., Dickinson County, INPS

September 7, 1 p.m., Ferguson's Pasture, meet at West Hawthorne Lake Boat Ramp, contact: Glenda Buenger and Patrick McAdams, (515) 632-8308. (Mahaska Co.)

September 7, 1 p.m., Cedar Hills Sand Prairie, led by Dr. Larry Eilers, TNC. (Black Hawk Co.)

September 8, 2 p.m., Kaufmann Avenue Goat Prairie, Dubuque, TNC. (Dubuque Co.)

September 10, 6:30 p.m., Ames High Prairie, Prairie Fungi led by Dr. Lois Tiffany, TNC. (Story Co.)

September 12, 7 p.m., Kalsow Prairie Walk, IPN, contact: Bradley Block, (712) 335-4395. (Pocahontas Co.)

September 14, 10 a.m., Sioux City Prairie and Broken Kettle Grasslands, led by Brian Hazlett, Jerry Selby, and Deb Quade, TNC. (Woodbury Co.)

September 20-22, IPN Annual Meeting, Camp Tanglefoot Girl Scout Camp, contact: Joel Hanes: (515) 424-5254.

September 28, 8:30 a.m., Prairie Harvest Days at Dick Lawler's Prairie, meet at the Eldora Welcome Center, IPN, call: (515) 858-3461. (Hardin Co.)

October 11, 8:30 a.m., Prairie Harvest Days at Hubbard Prairie, meet at the Eldora Welcome Center, IPN, call: (515) 858-3461. (Hardin Co.)

October 12, 10 a.m. White Pine Hollow, INPS

October 19, TNC Iowa Chapter Annual Meeting, Iowa City, TNC. (Johnson Co.)

## Freda Haffner, continued from page 3

Radiocarbon dating of cores taken by Collins in 1968 establish kettle age at more than 12,400 years before present. Kettle formation is attributed to a large block of ice surrounded by glacial till of the Altamont ice sheet. Upon retreat of the glacial ice and warmer temperatures, the ice block melted, leaving a large depression, more like a ravine.

The kettle bottom has been cored, revealing about 23 feet of layered sediments. Examination of these layers indicate time periods of erosion, drought and vegetation changes. A diatom flora first developed in the big kettle about 11,800 years ago. At first, the area's vegetation would have been similar to tundra, possibly with soil and trees on top of the ice block before it completely melted. Evidence shows a warming trend when the glacier retreated about 10,400 years ago.

Bits of wood encountered in sediments dating about 9,600 to 7,400 years before present indicate the kettle area was probably a spruce forest which was gradually replaced by deciduous trees. The kettle bottom may have supported swamp-forest or bog-like conditions at times.

As the climate changed to warmer and drier conditions, grasslands covered the region. Diatoms in the sediments indicate the environment was favorable for growth from 5,800 to 900 years before present. Pollen analysis from nearby West Lake Okoboji indicate a dry period from 7,700 to 3,200 years ago. Most of the region was prairie, as indicated by the presence of charred plant leaves in the lake sediments. A change in the kettle diatom flora about 900 years ago indicates a reversal of climate toward cooler and wetter conditions. Some believe this climate change, along with the more recent influence of settlers, allowed trees to again advance into the prairies.

Arend's Kettle prairie is very diverse with the presence of dry sandy knobs and prairie pothole marshes. With the retreat of the glacier and climate changes over the centuries, the kettle locale in northwest Iowa was subjected to plant migration from all directions. As a result, Freda Haffner State Preserve has both western and eastern species. Approximately 300 species of vascular plants have been found in the kettle and close to 350 species are known from the entire preserve.

On the drier areas of the kettle, especially ridge tops, can be found locoweed, hairy gramma grass, June grass, goldenweed, pale purple coneflower, silky aster, sneezewort aster, downy painted cup, ground plum, breadroot, toothed-leaved primrose and pasque-flower. Flowers beautify the seasons from March to September.

On the mesic slopes can be found members of the short and tallgrass prairies, including such species as spiderwort, prairie onion, big and little bluestem, dropseed, butterfly weed, ox-eye, stiff coreopsis, hard-leaved goldenrod, puccoon, false gromwell, pale-spike lobelia, milk-vetch, purple prairie clover, silver scurf pea, wild bergamont, larkspur, New Jersey tea, tall cinquefoil and bird's-foot violet. Slopes are colorful from May to September.

The prairie pothole marsh and pond support a variety of

wetland plants. The marshy ring of plants is made up of manna grass, sedges, rice cutgrass, short-awn foxtail, boltonia, St. John's-wort, smartweeds, ditch stonecrop, hybrid lysimachia, slender gerardia and monkey flower. Plants of standing water are cattail, bulrush, arrowhead, bur-reed, tufted loosestrife, and aquatic liverworts. In open water can be found pondweeds, tape-grass, naiad, coontail and bladderwort.

Arend's Kettlehole is home to a Federally endangered and State threatened plant, narrow-leaved prairie bush clover, *Lespedeza leptostachya*. The first population or stand studied was on the southeast slope of the kettle. Further study by several researchers resulted in the discovery of another six stands near the middle of the preserve.

Another species present at Freda Haffner is new to Iowa and botanists. The prairie moonwort, *Botrychium campestre*, was first discovered in the Loess Hills of Iowa in 1982. Individuals have been found at Freda Haffner on the kettle rim and on a plateau to the north of the kettle.

Other areas at Freda Haffner will reveal more prairie flora. On uplands the following can be found wood lily, rattlesnake master, skeleton-weed, showy goldenrod and compass plant. In the marshy areas can be found marsh marigold, purple milk vetch, licorice, narrow-leaved willowherb, marsh skullcap, swamp lousewort, flat-topped aster, boneset, blazingstar, Riddell's goldenrod, marsh ferns and white lady's slipper.

Several botanical studies have been done at Freda Haffner State Preserve. In 1972, Dillon presented data on hybridization between two species of loosestrife. Thirty-four species of mosses and liverworts were listed in a 1983 report by O'Keefe, van der Linden and Farrar. Several current studies are following the reproductive biology (pollination and seed predation) of several prairie plants.

The preserve is also home to many migrant and permanent animal species. Prairie skinks, yellow-headed blackbirds and badgers have been seen. Males of the Iowa threatened Poweshiek skipperling patrol kettle slopes in search of a mate in early July. A rare ostracode, *Cyprretta brevispina*, is being studied in the kettle pond. This species is found in only one other pond in Illinois, and is known from Sangamonian-aged lacustrine sediments.

The prairie areas of Freda Haffner were grazed until 1972, while most of the agricultural lands provided hay. The prairie areas are currently being managed by periodic burn treatments and brush cutting each summer by Anna Beal interns of the Nature Conservancy. The agricultural lands are to eventually become upland prairie, again. In 1993, the far northwest acreage was prepared for seeding as a reconstructed prairie. It is hoped that in years to come other native plants and animals will disperse into this area.

Thanks to Freda Haffner and the Nature Conservancy members, this parcel of prairie and geological history will enlighten our lives for generations to come. Please visit and enjoy the scenic valley and the floral display. Walk into the past, imagine ice and bison, and listen to the wind.

# The Dynamic Ecology of Prairie Pothole Wetlands

submitted by Paul R. Wetzel

An aerial view of the northern plains reveals thousands of small wetlands dotting the landscape. Wetlands deep enough to hold water well into summer glitter like jewels imbedded into a green carpet of foliage. Cursed by the original European settlers and later devastated by the domination of agriculture across the region, these saucer-like depressions in the landscape still play an integral role in the ecology and the sustenance of all the region's inhabitants.

## Hydrologic Patterns Form The Foundation Of Prairie Wetland Ecology

Prairie pothole wetlands are a result of glaciation and extend from northern Nebraska and central Iowa, into the eastern Dakotas and through southern Saskatchewan and eastern Alberta, covering 300,000 square miles (see map). During the final retreat of the continental glaciers, an ice sheet surged southward into central Iowa, forming what is now called the Des Moines Lobe about 14,000 years ago. An intricate array of rooms and tunnels formed in this ice sheet as it melted. Eventual collapse of these ice rooms led to the development of shallow upland swales and depressions separated by low saddle-like ridges formed from glacial debris, which we now see as prairie potholes. As a result of this process, many prairie potholes in Iowa are linked with very shallow drainage ways.

Hydrology remains the dominant environmental factor of prairie wetland ecology. Prairie wetlands receive water inputs from rainfall and surrounding overland flow. They are also connected to the surrounding groundwater. Wetland basins are

permeable and the water present in a wetland is simply a visible portion of the local water table. If the water table slopes into a wetland, groundwater seeps into the wetland. If the water table slopes away from the wetland, then water is drained from the wetland into the groundwater supply. The height and slope of the water table is not static, it changes over the course of the season and during years of drought and extreme wetness. Snowmelt and increased rainfall cause water levels to rise in the spring and slowly drop over the course of the summer. Severe droughts naturally occur every 10 to 12 years in the region and this inter-annual hydrologic regime causes water tables to fluctuate dramatically.

Many prairie wetlands in North Dakota and the Canadian provinces are saline, some as much as three times as salty as the ocean. The salinity results from the dissolving of salts (calcium carbonate, sodium chloride, magnesium sulfate) in the soil by groundwater. If water is seeping from the wetland into the groundwater (recharging) then the wetland will contain fresh water since its water source is from rainfall and overland flow. If groundwater is discharging into the wetland, it will contain many dissolved salts and the wetland will be saline. These salts are further concentrated because rates of evaporation are greater than rates of rainfall in this part of the region. In general, wetlands located on topographically higher locations in the landscape contain freshwater and those in lower areas of the landscape are more saline.

## Plant Species Distributions Are Dominated By Hydrology

The depth of water in a wetland forms a gradient that begins at the transition from dry upland to saturated soil, and extends toward the center of the wetland where there is deep open water. The length and depth of this water gradient depends on the shape of the wetland basin and the amount of water entering into the wetland at a particular time. Because some plants tolerate higher levels of water than others, wetland vegetation sorts itself into concentric rings or zones along the water gradient. Nearly 350 plant species are found in the prairie wetlands of the southern pothole region alone (this discussion limited to freshwater plants). Five vegetation zones are recognized. The driest zone is the wet prairie, followed by a wet meadow zone, a shallow emergent zone, a deep emergent zone, and an open water zone containing submerged aquatic plants.

The wet prairie zone is dominated by grasses, including bluegrasses (*Poa* spp.), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), and prairie cordgrass (*Spartina pectinata*). Goldenrods (*Solidago* spp.), compass plant (*Silphium laciniatum*), and meadow parsnips (*Zizia* spp.) are also common. Wetlands containing only wet prairie plants are called wet prairies or ephemeral wetlands. These wetlands will often be wet in the spring with only an inch or two of standing water and then dry out completely by mid-summer. During drought peri-



Extent of the prairie pothole region in North America (from Northern Prairie Wetlands, 1989).

ods, the wet prairies will remain dry all year, possibly for several years. Upland plant species may invade at this time, but when precipitation increases and the water table rises, the wet prairie plants will again dominate.

The wet meadow or sedge meadow vegetation zone is dominated by sedges such as *Carex stricta*, *Carex lanuginosa*, and *Carex praegracilis*. Green bulrush (*Scirpus atrovirens*), bluejoint grass (*Calamagrostis canadensis*), Torrey's rush (*Juncus torreyi*), woundwort (*Stachys palustris*) and bugleweeds (*Lycopus* spp.) are also common. Sedge meadows generally have a temporary water regime, with 10-15 inches of standing water that recedes by mid-summer. Small hummocks are often characteristic of the sedge meadow zone.

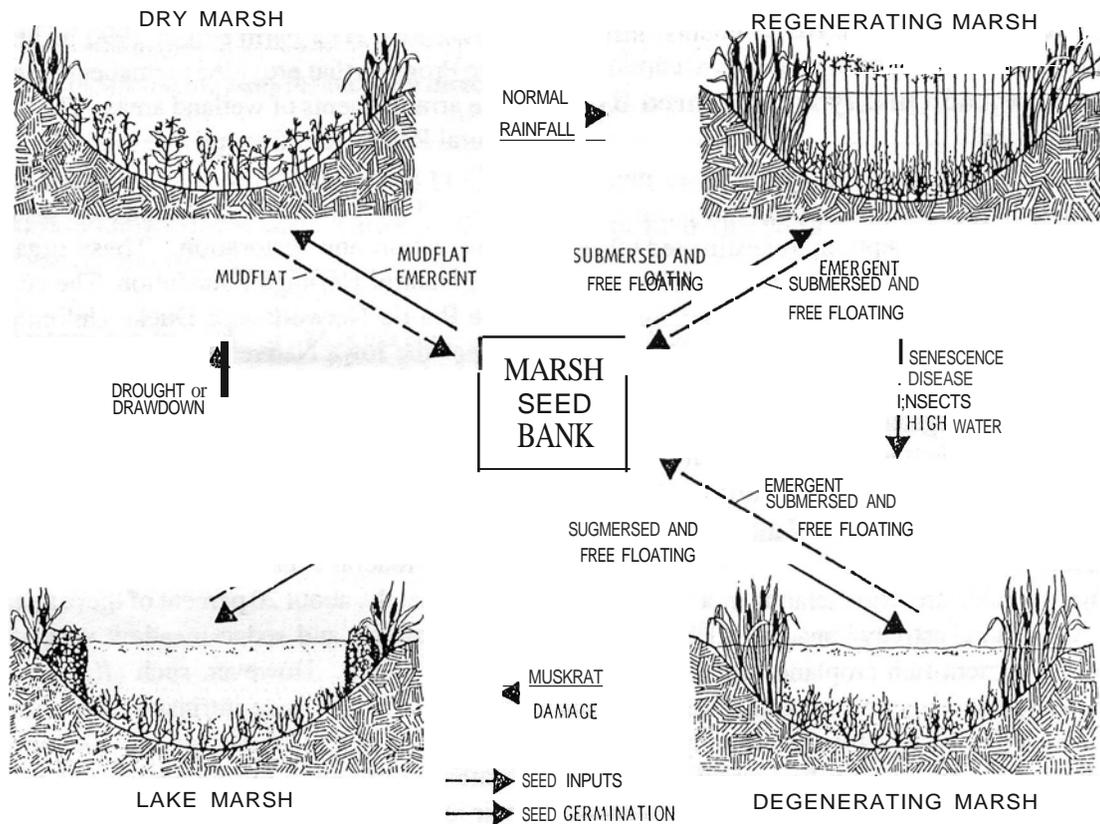
The shallow emergent zone is comprised of vegetation zones or entire wetlands that have standing water throughout most of the summer (seasonal wetlands). Typical vegetation in these zones include: river bulrush (*Scirpus jluviatilis*), broad leaf cattail (*Typha latifolia*), awned sedge (*Carex atherodes*), and lake sedge (*Carex lacustris*). Other common plants are water plantain (*Alisma triviale*), water smartweed (*Polygonum amphibium*) and common burreed (*Sparganium eurycarpum*). Floating and submerged plants begin to occur in the shallow emergent zone. Typical plants include duckweeds (*Lemna* spp.), common bladderwort (*Utricularia vulgaris*), and leafy pond-

weed (*Potamogeton foliosus*). Vegetation in the deep water zone is similar to the shallow emergent zone. This zone is considered semi-permanent, maintaining standing water in all but the very driest years.

Open water vegetation zones have permanent standing water up to 6 feet deep and are dominated by a variety of submerged aquatic plants common to lakes. Common species are pondweeds (*Potamogeton* spp.), bushy pondweeds, (*Najas* spp.), and water milfoils (*Myriophyllum* spp.).

### Seed Banks Guarantee The Survival Of Plant Species Through The Years

The dynamic inter-annual hydrology that results from the extremes of the prairie climate produce amazing fluctuations in the composition and structure of prairie wetland vegetation. The seed bank of a wetland plays a key role in this dynamic process. Seeds dispersed or produced in a wetland when growth conditions are favorable may remain viable, but dormant in the sediment for years or even decades. Therefore, seeds in the seed bank often represent a different group of plants than those plants currently growing in the wetland. The presence of seeds of plants from each vegetation zone in the seed bank allows these plant species to remain dormant or grow in response to changes in the water level, thus assuring long-term survival of the species.



Model of vegetation response to hydrologic cycle and the role of the seed bank (from Northern Prairie Wetlands, 1989).

During periods of drought, the shallow emergent zone will become dry, changing to exposed mudflats (see seed bank diagram). The mudflats are colonized by annual plants, such as beggar's ticks (*Bidens cernua*), nutsedges (*Cyperus* spp.), and smartweeds (*Polygonum pensylvanicum* and *Polygonum lapathifolium*). These plants grow well, producing many seeds that fall into the sediment. Plants from the wet meadow and deep water zones also germinate from the seed bank during water drawdown because their seeds often will not germinate underwater. When normal rainfall comes and water levels rise, the mudflat annuals will be drowned, but mature plants from the other zones survive because they tolerate higher water levels. During the next several years of normal rainfall, emergent species of the wet meadow and shallow emergent zones spread vegetatively, creating vegetative zonation patterns. Submerged plants also flourish in the open water zone. During the very wet part of the hydrologic cycle, the wet meadow plants die out in the deep water center of the marsh. At the same time, muskrat populations increase, eventually eating much of the emergent vegetation in the deep and shallow emergent zones. The start of another dry period continues the cycle until it reaches the drought stage again. At each stage, seeds are being produced for, or are germinating from, the seed bank.

The vegetation cycle outlined above and in the diagram is an idealized version of events. The cycle described is a feature of wetland basins over three feet deep, and shallow wetlands may not contain all the vegetation zones described or have the full cycle. Nevertheless, all prairie wetlands go through dry-wet cycles and the vegetation zonation responds accordingly.

### **Wetland Abundance And Quality Is Influenced By Agricultural Practices**

Any discussion of natural land features in Iowa must be divided into pre-European settlement and post-European settlement. Prairie wetlands are no exception. An estimated 60 percent of the land area of Iowa was covered with wetlands before European settlement. Today, 98 percent of those wetlands have been tilled, drained, or filled to cultivate the rich soil built by the vegetation response to the natural dry-wet hydrologic cycles. In the entire prairie pothole region, 20 million acres were covered with wetlands and over half have been converted to other uses. The high salinity of many of the wetlands in North Dakota and the Canadian provinces prevented them from being drained and cultivated.

The remaining wetlands are often islands in a sea of agricultural activity. Agricultural activity impacts wetlands in many ways. For example, nutrient-rich cropland runoff that enters wetlands causes a disturbance in the competitive relationships of the plants. The high nutrient levels enable weedy plant species, such as *Phalaris arundinacea* and *Typha latifolia*, to take over large areas or entire wetlands, when under natural conditions they would only represent a small part of the species composition. Changes in species composition, in turn, affect habitat quality available for wildlife. The prairie pothole region produces 50-80 percent of the North American waterfowl popu-

lations. A decline in waterfowl populations and nesting success over the last 100 years corresponds with the loss of wetland habitat due to wetland destruction and changes in the quality of the remaining wetlands. Current agricultural practice generally leaves a small fringe of vegetation around a wetland. Birds that feed in the wetlands and nest in the prairie uplands have had their nesting habitat completely eliminated. Nests on the wetland edge are highly preyed upon by egg-eating mammals, because their predators were displaced by agriculture long ago. Finally, loss of wetlands has meant a loss of water storage on the landscape. This has resulted in a faster flow of water over the land and into rivers and streams after heavy rainfall events, increasing the magnitude and severity of flooding.

### **Outlook For The Future**

Wetland loss in the prairie pothole region still continues, especially in the northern part of the region. Nevertheless, the wetland ghosts occasionally reappear on the landscape, as witnessed during the flood of 1993 when wetland vegetation sprouted from the seed bank in many low areas because underground tiles could not drain away the water fast enough. Attitudes toward wetlands are changing. For example, the federal government has gone from encouraging and subsidizing wetland conversion to protection of wetlands by eliminating all farm program benefits to landowners that convert wetlands to cropland in the provisions of the Food Security Act of 1985. Thousands of wetland acres have been taken out of agricultural production and enrolled in the Conservation Reserve Program (CRP). The Farm Bill of 1990 included a Wetland Reserve Program that provided permanent easements and 30-year lease arrangements of wetland areas. The Iowa Department of Natural Resources offers private land assistance opportunities and a property tax credit on existing wetlands greater than 2 acres. Many private organizations are also active in wetland conservation and restoration. These organizations include: Iowa Natural Heritage Foundation, The Nature Conservancy, Iowa Prairie Network, and Ducks Unlimited. Organizations such as the Iowa Native Plant Society can be instrumental in educating the public about wetlands—a necessary first step in changing attitudes.

Efforts have gone beyond preservation to restoration. Between 1987 and 1991, nearly 1,900 prairie potholes (about 6,700 acres) were restored in the southern prairie pothole region by state and federal agencies, many in connection with the CRP. Unfortunately, about 20 percent of these restorations failed and the wet prairie and sedge meadow vegetation zones did not naturally return. However, such efforts represent a recognition that wetlands have intrinsic value and play an important role in the success of human activities in the region. More detailed information on the ecology of prairie wetlands and their restoration can be found in two books: *Northern Prairie Wetlands* (1989), edited by Arnold van der Valk and *Restoring Prairie Wetlands, An Ecological Approach* (1994) by Susan Galatowitsch and Arnold van der Valk. Both books are published by Iowa State University Press in Ames, Iowa.

## Form for nominations:

Nominee: (may be yourself) \_\_\_\_\_

Office:      President              Vice President              Secretary              Treasurer

Nominated by: \_\_\_\_\_

Send to Bill Thomas, 11490 8th St., Marion IA 52302, or bring this to the annual meeting.

## Membership Form and Survey:

**Your input and support of INPS are important.**

Please complete and send with your 1996 dues of \$10 to Mary Brown, 330 Windsor Dr., Iowa City, IA 52245.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone#: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ E-mail address: \_\_\_\_\_

Additional information or special interests for member directory entry: \_\_\_\_\_

Program ideas?: (Skills or knowledge to share with other INPS members, field trips you are willing to lead or would like offered, workshopordiscussiontopics) \_\_\_\_\_

INPS member form and survey Aug. 96  Mark this box if your DO NOT wish this information published.

## Iowa Lakeside Laboratory - Lodging

Name: \_\_\_\_\_ Number in party: \_\_\_\_\_

Night(s):    6 Sept.              \_              7 Sept.              \_              Cabin with shared bath              (\$ 10 fee/night/person)

Cabin with private bath

Fees payable at Lakeside, do not send with reservation.              and air conditioning              (\$15 fee/night/person)

(Extra charge for linens, if needed)

Send reservation form to Deb Lewis, 341 A Bessey, ISU, Ames, IA 50011-1020

August 1996

# Silky Prairie Clover - A Rare Iowa Prairie Native

submitted by Ed L. Freese and Nancy Slife

We remember the first time we encountered this rare species while enjoying an early summer walk on the dune-like ridge at Cedar Hills Sand Prairie in Black Hawk County. At first glance the plants looked like leadplant, but the leaves were too small and there were bare stems of last year's growth. We decided it must be silky prairie clover (*Dalea villosa*). After finding that this population is far from its normal range, and a member of the sand dune flora, we decided to investigate its natural history.

Silky prairie clover is listed as an endangered vascular plant in Iowa with populations known only from northwestern Black Hawk County. This perennial plant's stems grow anew each spring, budding from near the base of last year's stems. With its hairy leaves and bushy growth it resembles leadplant, but its compound leaves are shorter (1"-2"), more like purple and white prairie clover. There are usually 13-19 leaflets, and the plants grow to about two feet tall.

This legume's flowers are usually purple to lavender or sometimes almost white. Flower clusters or spikes are erect and two to four inches long. There are quite often several spikes and flowering branches per plant. Flowering in Iowa usually starts mid-July and may last into late August.

Silky prairie clover is usually found from southern Saskatchewan to northern Texas, with most populations found west of the Missouri River. Probably the closest plants to Black Hawk County are those found along the Mississippi



River in southeastern Minnesota at Weaver Dunes, which is at least 100 miles away. This species may not have been known from Iowa's flora until collected by Myrle Marie Juliana Burk in 1929. But Martin L. Grant reported it as a new species for Iowa as recently as 1949.

This prairie clover is most often found in sandy prairie, often on dry hills and sand blow-outs. It apparently prefers dry disturbed prairies and shifting sands. Grazing and wallowing by bison may have helped provide the openings the plant needed. Two sand-loving plants growing in association with silky prairie clover at Cedar Hills are frostweed (*Helianthemum bicknellii*) and a rare panic grass (*Dichanthelium perlongum*). In northwestern Black Hawk County, there are many areas of wind-blown and water-carried sand deposits, but silky prairie clover is absent from most.

Silky prairie clover was first collected by Thomas Nuttall in North Dakota about 1818 and named *Petalostemum villosus*. Later, Curt Polycarp Joachim Sprengel reported the plant as *Dalea villosa* (1826). In 1891 another botanist, Carl Ernest Otto Kuntze, listed the species as *Kuhnistera villosa*. Today the accepted name is *Dalea villosa* (Nutt.) Spreng.

The generic name *Dalea* honors an English botanist, Samuel Dale, and was first used by Linnaeus. *Petalostemum* was first used by André Michaux in 1803 and refers to the union of the petals and stamens. The species name is from the Latin, *villos*, meaning hairy.

Altogether silky prairie clover gives us a lesson in botany, geography, ecology and botanical history. We may never know how or why these plants are growing so far from their cousins. The answer might be found only if we could go back in time and observe the glaciers advance and retreat, and see the prairies being formed.

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