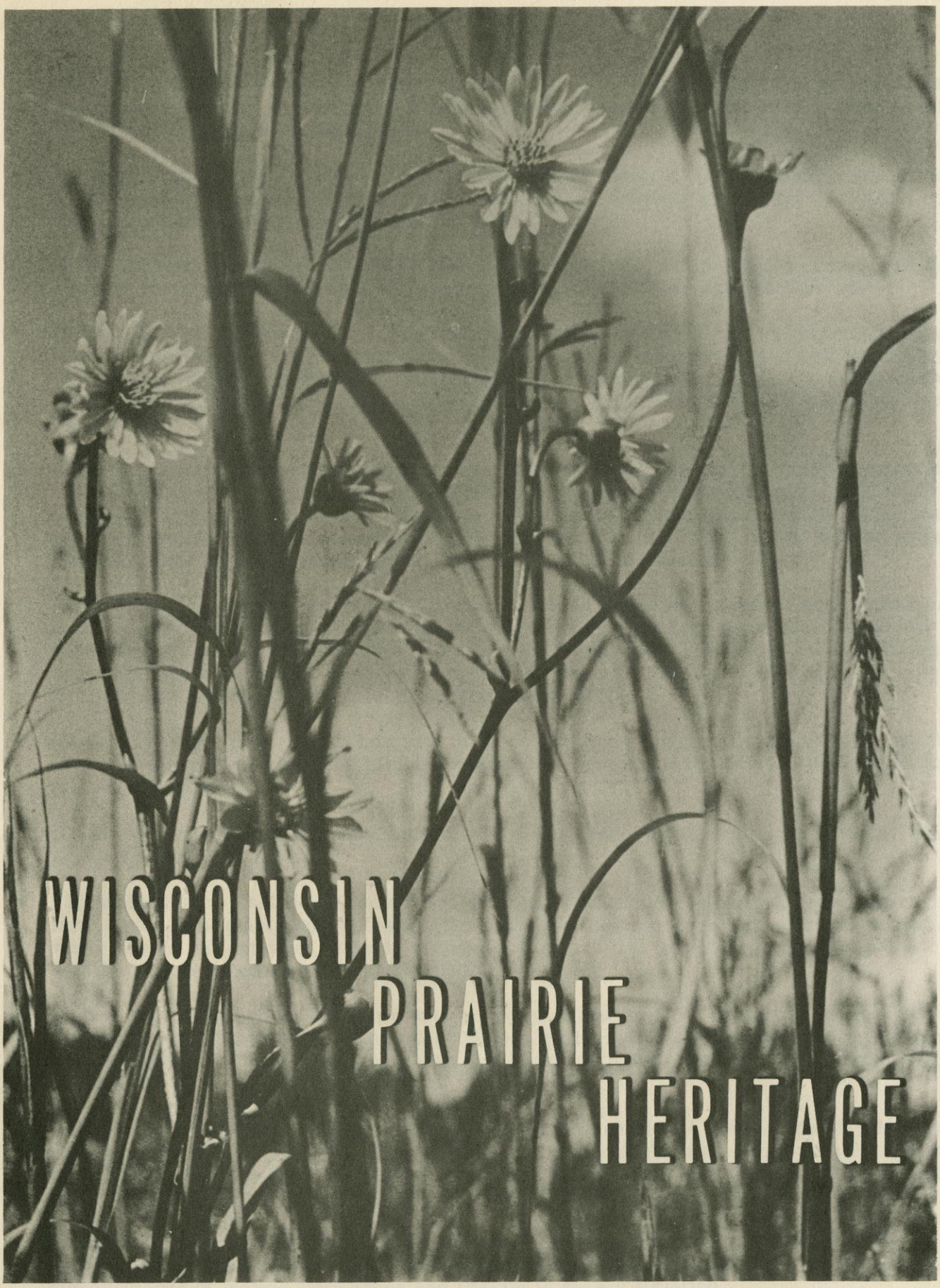
Wisconsin's prairie heritage. 1971

Madison Public Schools (Wis.); Dept. of Curriculum Development; Local Materials
[Madison, Wisconsin]: Local Materials, Madison Public Schools, 1971

https://digital.library.wisc.edu/1711.dl/6B27KUNEMMIHI9A



Instructional Materials About Our Community

Local Materials

Curriculum Development

Madison Public Schools

545 W. Dayton St.

Madison, Wisconsin 53703

"Wisconsin's Prairie Heritage"

OBJECTIVES:

To increase the student's awareness and curiosity about Wisconsin prairie history and the ecological relationships in a prairie.

To encourage analysis and discussion of man's role and responsibility in the preservation of natural communities.

SUGGESTED USES:

These materials were written for the 7th grade interdisciplinary unit on studying natural environment of the student's community.

The materials are also suitable for high school level.

Wisconsin's Prairie Heritage

1. Colophon

2. Title Frame
   Wisconsin's Prairie Heritage

3. Credit Frame.
   Written by Virginia Kline, Curriculum Development — Local Materials, Madison Public Schools. Mary Lou Peterson, Supervisor. Photographers: Virginia Kline, Harriet Irwin, Bill Cronon, and Ron Austin.

4. Here is a map made when Wisconsin was still wilderness country. What pictures come to your mind when you think of Wisconsin before settlement?
   (Early Wisconsin map from collections of the State Historical Society of Wisconsin.)

5. Deep forests?

6. Wetlands?

7. Open prairies? Actually Wisconsin was richly endowed with all of these natural communities, and others as well, although many people picture a state that was completely forested.

8. The earliest explorers came by waterways from the northeast and saw first the great forested areas.
   [The general location of Wisconsin forests at the time of settlement is shown in green on this map.]
   Later, as they penetrated farther south and west, and as other explorers and settlers began to arrive by land routes from the south, the prairie areas were discovered.
   [Treeless prairie is shown in plain gold here, while gold with black dots shows areas where widely spaced trees grew among the prairie grasses and flowers.]

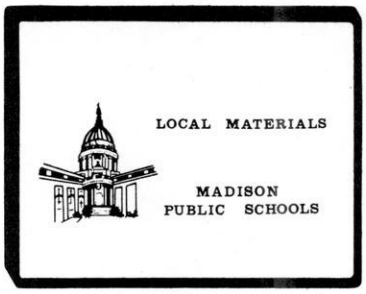
9. Perhaps because the newcomers were more familiar with forests in the lands from which they came, their descriptions of Wisconsin prairies were full of wonder. Here was something never seen before! — waves of grass like the waves of the sea!

10. They spoke of bright colored flowers blooming among the grasses, . . .

11. . . . and of being able to see great distances across the open land. One early writer put it this way: "On the summit levels spreads the wide prairie, decked with flowers of the gayest hue; its long and undulating waves stretching away till sky and meadow mingle in the distant horizon."
    (Owen, D. D., 1848)

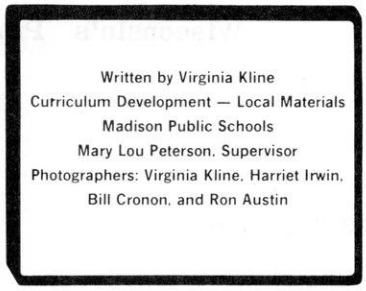
12. Many reported with amazement the great height of the grass — so tall that a cow or horse straying away could disappear completely from view. Trails disappeared from sight too. The wife of a fur trader wrote, "In this open country there are no landmarks. One elevation is so exactly like another that if you lose your trail there is almost as little hope of regaining it as of finding a pathway in the midst of the ocean. The trail . . . is a narrow path deeply indented by the hoofs of the horses on which the Indians travel in single file. . . . It is difficult sometimes to distinguish it at a distance of a few rods."
    (1 rod equals 16 1/2 feet)

13. The early explorers and settlers also described groves of oak trees in the prairies — trees spaced as if in orchards, with prairie grasses underneath. They called these groups of trees oak openings or prairie groves, and wrote glowing descriptions of the landscape of alternating groves and open prairie.



1

2



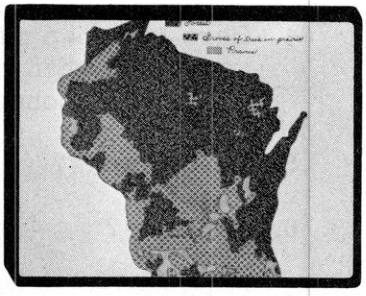
3

4

5

6

7



8

9

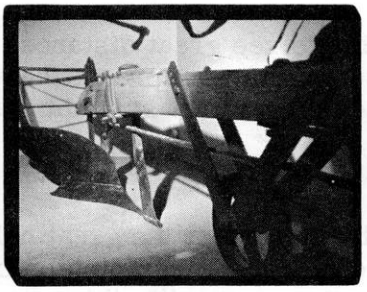
10

11

12

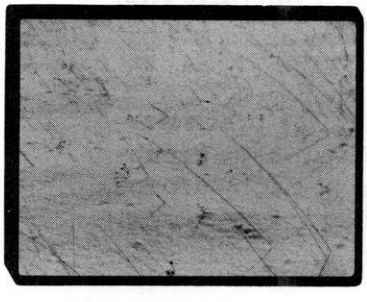
13

14

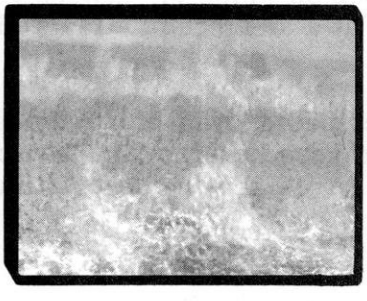


15

16



17



18

19

20

14. Although impressed by the beauty of the prairie, they assumed at first that these soils must not be fertile. Previous experience had taught them to expect forest to be growing on the good soils.

15. Even after the great fertility of the soil was recognized, breaking the prairie sod was impossible with the wood plows which were then in use. It took a special "breaking plow" made of steel and pulled by several teams of oxen to break the closely packed mat of roots of the virgin prairie.
(The breaking plow shown is at the Wisconsin State Historical Society.)

16. Today Wisconsin prairie soils support some of the most productive farms in the nation. In fact the richness of prairie soil was the main factor leading to the destruction of 99% of Wisconsin's 2 million acres of prairie.

17. The families who came to live on the prairie experienced hardships as well as beauty. The incredibly hard work defeated many.

Winters were harsh and long, and many complained of the wind day after day, night after night, endlessly sweeping across the prairie, howling through the cracks in the cabin.

18. The fires the settlers dreaded probably had been an annual occurrence before settlement. They were started by lightning or deliberately by the Indians, who used fire to aid their hunting. The fires usually burned in fall or spring when the tall grass stalks of the previous summer were dry and inflammable — The fire traveled faster than a man could run!
The effect of the fires in preventing tree invasion is explained with pictures in the filmstrip "Madison School Forest, Part I — Clues to the Past" produced by Local Materials, Madison Curriculum Department.

19. All these reactions to the vast prairie are part of Wisconsin's exciting past. Scientific studies of the prairies began during this time and continue today on the few remaining prairies. Much has been learned about prairie ecology, but many questions remain. This is always true when natural communities are studied.

20. Not all treeless areas are true prairies. A prairie is a special community of particular plants and animals. By scientific definition a prairie is a natural community in which more than 50% of the vegetation consists of grasses. To study prairies then, it will be helpful to become familiar with some of the prairie grasses.

21. The species of grass will vary according to the moisture of the site. Although identifying grasses accurately requires special skills, many can be recognized in the field by observing their general appearance. For example, cordgrass, a grass common to wet prairies, looks very different from . . .

22. . . . another wet prairie grass called bluejoint grass. Bluejoint pastures were considered very choice by the early settlers.

23. In dry or xeric prairies little bluestem grass is frequently the most common. Note the fuzzy "beards" on the seeds and the beautiful warm fall color. Turning fall color is a characteristic of prairie grasses.

24. Up close the seed heads of little bluestem look like this. The silky hairs attached to each seed allow the seed to blow away in the wind.

Wind dispersal of seeds is important for many prairie plants.

25. Here another dry prairie grass, prairie dropseed, shows a different fall color. This grass also shows the "bunch" growth typical of many prairie plants.

26. The seed heads of side oats gramma grass form an unusual artistic pattern. Like the other grasses of dry prairies, side oats gramma grass is rather short — less than two feet tall.
(Farther west in the plains states, the native grasses are species that are even shorter.)

27. Prairies where the soil is neither very wet nor very dry are referred to as mesic or deep soil prairies. This was the kind of prairie the settlers were seeing when they said the grasses were "knee high to a man on horseback."
(The grasses in this midsummer picture have not yet reached full height.)

28. The tall grasses included Indian grass, with seed heads soft to touch, . . .

29. . . . and big bluestem grass, which was also called turkey foot grass because of the shape of the heads. Big bluestem was the dominant grass in the tall mesic prairies.

30. Each grass has a distinctive appearance but all have some things in common. For example, all have flexible leaves and stems that yield to the wind without breaking.

31. The leaves of grasses are narrow and expose little surface to wind and sun, thereby reducing evaporation and conserving water. The vertical position also cuts down sun exposure. In periods of drought the leaf edges roll inward, exposing even less surface.
(Prairie June grass is shown — a grass of dry prairies.)

32. Another characteristic of grasses is pollen which is wind borne. Here you can see dangling stamens with ripe red and yellow pollen. Wind transportation is readily available on the prairie!
(Big bluestem with red stamens, Indian grass with yellow.)

33. All the prairie grasses die down to the ground each fall. In winter there are no living parts above ground.

34. With the grasses grew more than 200 other species of flowering plants — a tremendously rich array of prairie wildflowers. In a forest most wildflowers bloom in the spring; but in a prairie, flowers can be found in bloom all summer long. This picture of a prairie was taken in May.
Chiwaukee Prairie (shown) is located in the SE corner of Wisconsin, near Kenosha. Flowers in the picture include (yellow) puccoon and (white and pink) shooting star.

35. In June the same prairie looked like this.
(Black-eyed Susans and prairie phlox)

36. In August the purple spikes of prairie gayfeather made a different splash of color, . . .

37. . . . and still later goldenrods and asters blended with the fall colored grasses. The prairie flowers and grasses grow close together, forming a continuous carpet. Sharing soil, water, and sunshine, these plants are adapted to crowded co-existence.

38. Like the grasses, the prairie flowers (or forbs, as they are sometimes called) are drought resistant, with water conservation features. Many have narrow vertical leaves just as the grasses do, . . . (Yellow star grass)
(Forb: a flowering plant which is not a grass and is not woody.)

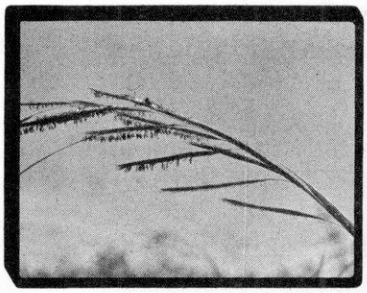
39. . . . or leaves that are finely divided. The limited leaf surface helps reduce evaporation.
(Purple prairie clover)

40. Some prairie plants have flowers, leaves and stems covered with soft hairs which keep the drying winds from blowing along the plant surface . . . (Pasque flower)

41. . . . while others have leaves and stems coated with a waxy substance which keeps the moisture in. (Spiderwort)

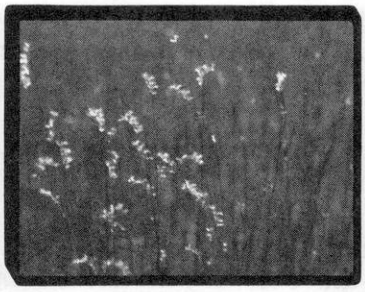
In addition to narrow wax-coated leaves, this plant has sap which might be described as "gooey". This kind of sap . . .

42. . . . and the milky juice of milkweeds are thought to be helpful in preventing evaporation of water from the plant. (Bluntleaf milkweed)



21

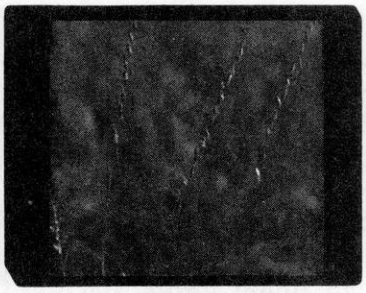
22



23

24

25



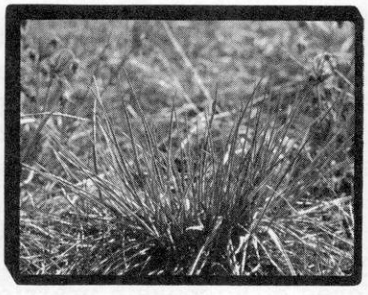
26

27

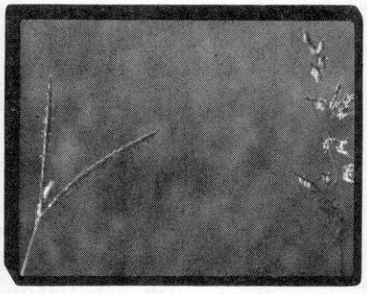
28

29

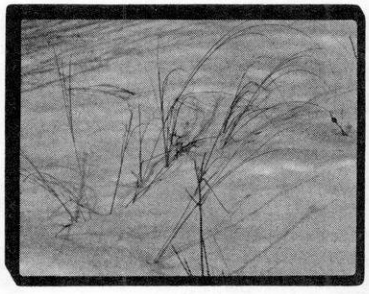
30



31



32



33

34

35

36

37

38

39

40

43. Some prairie plants have their largest leaves near the ground where it is cooler, shadier and less windy. The more exposed leaves at the top of the plant are smaller. (Cut leaf compass plant)

44. Here is a plant which carries this idea even farther and has leaves only at ground level. (Prairie smoke)

45. There are some plants of very dry prairies which grow only in spring, taking advantage of a time when the soil is still moist. During the dry summer their leaves wither and disappear. (Shooting star)

46. Prairie dock seems to have leaves too large for a prairie plant — neither narrow nor divided.

47. Notice, however, that the leaves are held vertically and that most of the leaves seem to be lined up in the same direction. The narrow edges are pointing in a north-south direction so that the hot midday sun does not shine directly on the broad leaf surface. Because of this, this plant is sometimes referred to as a compass plant.

48. But the most important drought adaptation of both flowers and grasses is one you don't see when you walk through the prairie. Prairie plants have extensive underground root systems that together weigh more than twice as much as the leaves, flowers and stems above ground. Thus much of the plant is never exposed to drying sun and wind. Some of the plants have thickened roots which can store moisture. Many have very deep roots — often as deep as six feet — which reach down into the moist layers of soil.

49. The prairie community includes plant eaters as well as plants. Before settlement the largest of the prairie plant eaters was the American bison — sometimes called buffalo. It is hard to believe that thousands of these huge animals once grazed in southern Wisconsin. An early canoe party on the Wisconsin River reported having to wait for a herd of bison to cross the river. People in canoes didn't argue with beasts weighing 500-1000 pounds!

50. The last wild bison in Wisconsin was killed in 1832 — just five years before Madison was settled. Today we can only imagine the appearance of thousands of these animals grazing on 2 million acres of Wisconsin prairie.

    The bison is an example of a hoofed mammal which moved about in herds on the prairie. There were also herds of elk and deer, most often near the prairie-forest border.

51. Another common form of mammal behavior on the prairie was tunnel making. This expert burrower is a thirteen lined ground squirrel. Today this small prairie mammal is at home along roadsides and in parks and farm fields. Its diet is mainly plants but includes some insects, especially grasshoppers. Because the ground squirrel feeds in the daytime and above ground, it has large eyes to help it watch for danger.

52. On the prairie, the thirteen-lined ground squirrel might become food for a red-tailed hawk or a coyote — part of the daily eat-and-be-eaten drama which makes up a natural food web.

53. The mole is another prairie tunnel maker which is still widespread in southern Wisconsin. While the ground squirrel is a plant and insect eater, the mole's diet is mainly insects and earthworms. The mole lives and feeds in darkness underground and is blind.
    (Note the spade-like front feet, well adapted for digging.)

54. Insects are a very important part of food webs on a prairie. Here aphids suck nourishing plant sap from a goldenrod plant.

55. Another insect, a lacewing larva, in turn eats an aphid.

56. Prairie ants sometimes tend aphids and obtain plant juice or "honey dew" from them by stroking their bodies. These black-and-red prairie ants are tending small black aphids.

41

42

43

44

45

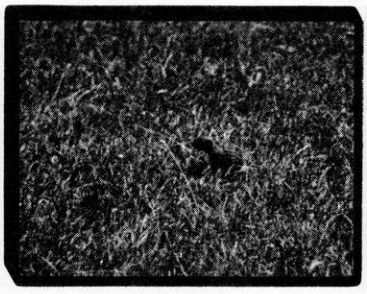
46

47

48

49

50



51

52

53

54

55

56

57

58

59

60

57. Prairie ants make large ant hills in the prairie. Their tunneling in the soil has an effect somewhat like plowing — loosening and mixing the soil. Thus the tiny ant helps maintain soil for the prairie plants.

58. Insects are very important in pollinating prairie flowers. Here a bumblebee obtains nectar from a small lousewort plant. Pollen sticking to the bee's body may be carried to another lousewort plant, enabling that plant to produce seed.

59. Insects are extremely plentiful and varied on the prairie. The role played by many of them is unknown. Many mysteries remain to be solved. It is likely that we may be too late to study some of these relationships. No one knows how many prairie insects may have become extinct as the prairies have been destroyed.

60. Destruction of its prairie habitat threatens the survival of larger animals also, including this unique bird — the prairie chicken. What you see here is the remarkable courtship performance of the male prairie chicken. The orange pouches on its head are inflated only at this time.

    Today prairie chickens are making a last stand in central Wisconsin, where conservation groups have succeeded in preserving some suitable grassland.

    [Organizations which have bought land include the Prairie Chicken Foundation and the Society for Tympanuchus Cupido Pinnatus, which is the scientific name for prairie chicken.]

61. The meadowlark, common along our farm roadsides today, once was at home on Wisconsin prairies. Like many prairie birds, the meadowlark has a flight song . . .

62. . . . and builds its nest on the ground. There were few singing perches or shrubs to support nests on the prairie!

63. The meadowlark's song is a voice from the past — from a time when the sun set on two million acres of Wisconsin prairie. Meadowlark, bison, bumblebee, blue stem, prairie dock, and Indian grass — all were part of the dynamic prairie community.

64. In the Wisconsin landscape of farm fields and growing human communities today, what remains of Wisconsin's prairie heritage?

65. There are some reminders in place names given by early settlers.
    (Examples: Sun Prairie, Blooming Grove, Prairie du Sac)

66. Many a southern Wisconsin farm yard has a row of Norway spruce trees planted long ago to break the endless winds of the prairie. Seldom found in farmland that began as forest, these frequent rows of planted trees are evidence of the prairie past.

    [The story goes that the reason most of these windbreaks are of one kind of tree is that a mail order company offered Norway Spruce trees as a bonus for large orders.]

67. The farmer sees evidence of the prairie each time he turns over the rich soil built by decades of prairie growth. Prairie soils contain much more organic matter than forest soils and are highly prized for farming. Research is currently in progress to learn more about how a living prairie increases soil fertility.

    [See diagram comparing organic matter in forest and prairie soils included in packet.]

68. A few of the original prairies remain. Often the ones remaining are dry prairies on steep hills of limestone rock or glacial gravel. On this hillside in Green County, the soil was too shallow to plow and the steep slopes discouraged grazing. On the hill grow five acres of original prairie. This prairie is now protected through the action of a conservation organization which devotes all its effort to buying and preserving prime natural areas of Wisconsin.
    (Wisconsin Chapter, The Nature Conservancy)

69. If left unprotected, dry hillside prairies today are vulnerable to a new threat — the increasing demand for crushed rock and gravel for construction. Here you can see what happened to one dry prairie on a limestone hill.

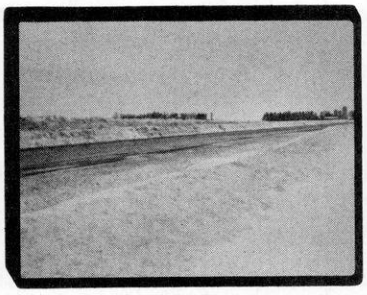
61

62

63

64

65



66

67

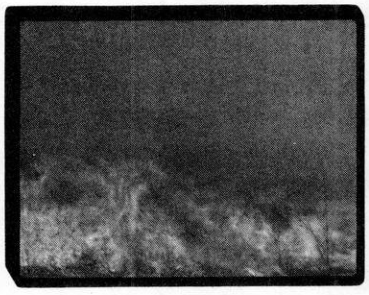
68

69

70

71

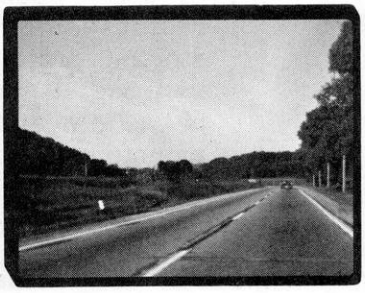
72



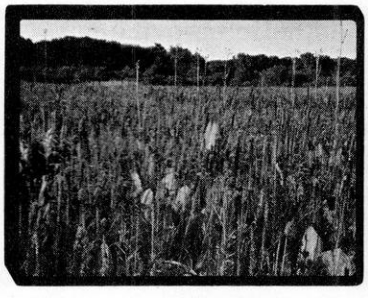
73

74

75



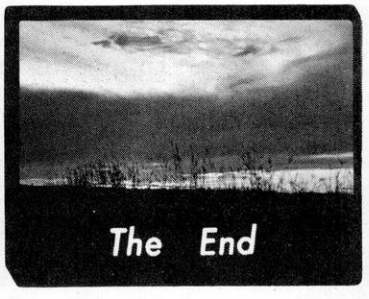
76



77

78

79



80

70. Some prairies have persisted in the sandy soil areas of central Wisconsin -- along roadsides or in fields unsuited to agriculture. Here the prairie plants protect and improve the soil while adding diversity to the landscape. A new threat to such prairies is the planting by man of acres of pine trees. As the pine plantations mature, the prairie plants beneath them will die. Tree planting is not always desirable!

71. The mesic prairies are especially rare. Their deep soils today support the corn belt of the midwest.
[Arlington "Prairie" just north of Madison is an example of an area of rich farmland where mesic prairie once grew.]

72. Occasionally a sample of mesic prairie can be found along a railroad right-of-way. This particular one is abandoned and no longer has a track. It is interesting that the railroads, without intending to, preserved strips of prairie. There are two reasons for this. First there was no plowing along the right-of-way. Second, the plants along the tracks were sometimes burned — either set on fire by the coal-fired engines or by railroad "weed control" crews.

73. Fire is important in maintaining prairies in Wisconsin. Unlike prairie areas farther west, the climate here is suitable for trees. This means that forest is likely to invade prairie here in the absence of fire. The prairie fires so feared by the early settlers are thought to have been responsible for maintaining the Wisconsin prairies. Prairie plants and animals are adapted to fire so suffer little when the prairie is burned.
[Deep roots and buds beneath or near the surface help plants survive fire. Animals may flee (buffalo, elk) or retreat to tunnels (ground squirrel).]

74. Because so few prairies remain, today many people are interested in trying to start new prairies. The University of Wisconsin Arboretum has pioneered in such prairie restoration. This is one of two prairies planted at the Arboretum on former farmland. Fire has been found to be important in aiding restoration, both for preventing invasion by trees and shrubs and for discouraging weedy plants which are not part of a natural prairie. Fire appears to benefit prairie plants in other ways as well. Studies on the effects of fire and on restoration techniques are examples of current research on prairies.

75. Arboretum prairies are burned every two years. Photographers for the Walt Disney film "The Vanishing Prairie" came to the Arboretum to obtain prairie fire sequences for the film. It's not easy to find a prairie fire to photograph today!

76. In Dane County between Middleton and Cross Plains, there is a demonstration prairie restoration project between Highway 14 and the railroad track which parallels it. Restoring prairie here had the advantage of the prairie plants still persisting along the railroad. It is hoped that this strip will show that growing prairies along highways can be a low maintenance way to add variety and beauty to our roadsides, which often are monotonous strips of mowed lawn grasses.
[The prairie strip is on the left of the highway here (south side). Note the reddish brown color of the prairie grasses.]

77. The few remaining original Wisconsin prairies and the growing number of restored prairies will help scientists to learn more about prairie ecology. Just as important, they will provide an opportunity for young and old to reach back into the past, to experience the unique beauty of the prairie, and to share the adventure of new discovery.

78. For man then, a preserved prairie provides increasing knowledge, esthetic enjoyment, a glimpse of the past.

79. For some of the living things of the prairie, it is a question of absolute survival. Without protected prairies, many prairie species, with their remarkable adaptations which evolved long before man, would cease to exist. Perhaps in a deeper sense their right to survive should not have to be defended by showing a value to man.
(The plant is a rare prairie orchid.)

80. The End.

Discussion Questions

1. The plant in slide 43 has its largest leaves close to the ground. The flowers however are held well above the ground in an exposed position. Can you suggest an advantage to this? (Consider the purpose of the flower)

2. Although shooting star (shown in slide 45) is a prairie plant, it often is found in oak forests in this part of the state. Why might it be? What makes it better able to survive forest conditions than many other prairie plants?

3. (Slide 52) Some hawks are still found in southern Wisconsin, while coyotes can be seen only in zoos. Can you think of reasons why hawks have persisted while coyotes have not?

4. (Slides 61, 62) Meadowlarks are common, but another prairie bird, the passenger pigeon, has become extinct. Still others such as upland plover and horned lark now have limited distribution. Using references to find out the story of the passenger pigeon, and the habits of the other birds, can you suggest a reason for the differences in numbers of these birds today?

5. (Slide 58) Consult references and examine garden and other flowers to discover pollination mechanisms. What differences can you observe between flowers pollinated by wind (such as grasses, ragweed, many trees) and those pollinated by insects (most prairie forbs, many garden flowers)? What characteristics does wind borne pollen have? Insect carried pollen? Goldenrod has insect-carried pollen. Would it be likely to cause hay fever?

6. Refer to the diagram of distribution of organic matter in prairie and forest soils. Which has more organic materials above ground? below ground? Do you have some ideas as to why so much organic matter accumulates in prairie soil? How would you design an experiment to show whether a particular factor was important? Some factors under study are the role of fire, the role of decaying surface litter, the role of roots.

7. (Slide 71) What differences can you think of between a cornfield and a natural prairie? (Number of species present? habitat for animals? resistance to disease? soil protection? soil improvement?)

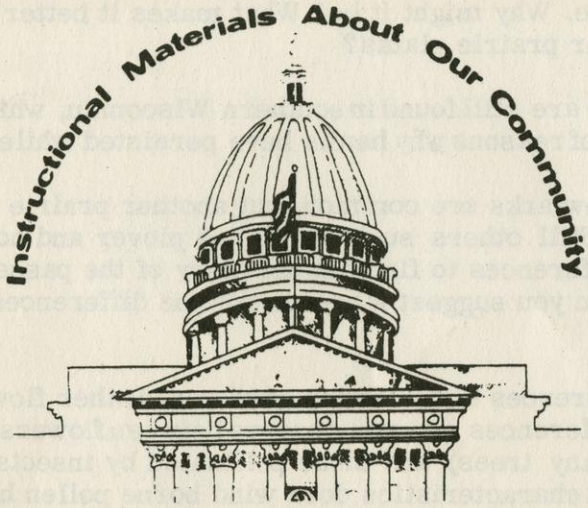
8. (Slide 70) From your own observation what grows under mature pine plantations? What problems can this lead to?

9. Think about man-planted and controlled land areas in general — lawns, gardens, pavement, farm fields, pine plantations — Discuss the effect of uniformity (one kind of grass in lawns, whole fields of potatoes, beans, corn, etc.) on natural balances (insect control, etc.) wildlife, man (esthetic as well as physical).

10. (Slides 72, 73) Railroads used fire to control brush and "weeds" along the tracks. Today the railroads often use chemical plant killers instead. What effect will this have on the remnant prairies along the tracks? What problems are involved in trying to prevent use of chemicals?

11. (Slide 73) What adaptations of prairie plants can you think of that would allow the plants to live through a fire? What adaptations of prairie animals? At what season would a fire be most damaging to a plant? Least damaging? If you were to plan to burn a prairie to help maintain it, what time of year would you choose and why?

12. (Slide 76) What do you think might be some of the problems in persuading the highway department to plant and maintain prairies along highways? Compare the advantages and disadvantages of mowed lawn grass and prairie in such a situation.



Local Materials Curriculum Development

MADISON PUBLIC SCHOOLS
Madison, Wisconsin

Douglas S. Ritchie
Superintendent of Schools

Carmelo V. Sapone
Director of Curriculum

Angeline Beckwith
Acting Coordinator, IMC

Mary Lou Peterson
Supervisor, Local Materials