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# ROADSIDES FOR WILDLIFE



A Supplementary Curriculum  
Produced By  
The Minnesota Environmental Science Foundation, Incorporated  
for the  
Pioneerland Regional Environmental Education Council  
and the  
Minnesota Department of Natural Resources, Roadsides For Wildlife Program

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# ROADSIDE STATUS

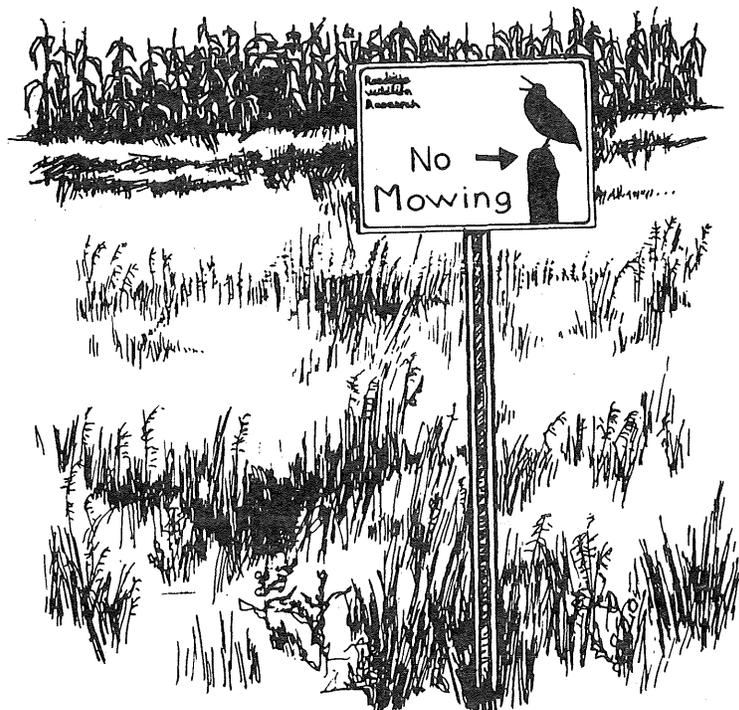
A recent study showed that more than 230,000 acres of roadside habitat in Minnesota's pheasant range was disturbed during the nesting season — **PRIMARILY BY EARLY MOWING** (1983 data — does not include shoulder mowing). The pheasant range is roughly the area south of a line from Moorhead in Clay County to Pine City in Pine County.

Road Type	Miles	Managed by	Estimated Acres	Average Roadside Width (ft.)	Percent Cover Disturbed *
Federal Hwy.	( 2,910)	State DOT	32,044	44.5	57
State Hwy.	( 5,076)	State DOT	58,197	46.7	52
County St. Aid Hwy.	(20,237)	Co. Hwy. Dept.	160,693	32.7	47
County Road	( 9,119)	Co. Hwy. Dept.	56,363	25.5	44
Township Road	(39,387)	Twtnshp. Board	218,010	22.9	38

\* Disturbed on or before July 28, 1983. Many roadsides are also mowed during late summer and fall.

## THREE MAJOR DESTRUCTIVE PRACTICES ARE HURTING OUR ROADSIDE WILDLIFE:

- \* **Mowing** of the ditch bottom and backslope before August 1. Early mowing destroys many nests and kills incubating females.
- \* **Indiscriminate roadside burning** — Under prescribed conditions, burning can be an effective wildlife management tool. However, in regions where intensive row crop production and fall plowing is practiced, widespread roadside burning removes critically needed residual nesting cover as well as roosting and escape cover.
- \* **Illegal farming encroachments** (i.e. row crops) affect more than one-third of Minnesota's public rights-of-way. Total loss of nesting habitat each year exceeds 50,000 acres within the pheasant range.

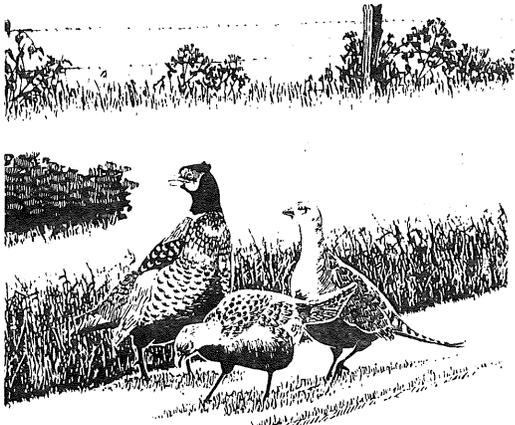
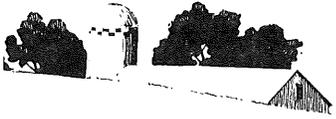


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# ROADSIDES FOR WILDLIFE



Grassy roadsides can be for the birds! Although these ribbons of green make up only a small fraction of our land area, researchers have found them to be highly productive nesting sites for more than 40 kinds of birds and animals that nest on the ground or in low vegetation. Examples include pheasants, gray partridge, rabbits, waterfowl, and songbirds. Unfortunately, many thousands of nests and nest sites are destroyed annually in southern and western Minnesota because of disturbance to our roadsides during spring and summer (late April through early August).

Management plays a key role in how productive our roadsides will be for wildlife. Your help is needed . . . to give wildlife the edge.

## \* **Delay roadside mowing of the ditch bottom and back slope until after August 1st.**

*Reason:* Each species of wildlife has its own nesting habits including when and how many times they rear young each year. As a result, undisturbed roadside cover receives almost continuous nesting use from spring until late summer. By delaying roadside disturbance until after August 1, nests for most species can hatch successfully. A mowed strip along the shoulder is not damaging to nesting wildlife because most nests occur in the ditch bottom or back slope. Other disturbance factors which should be avoided include "blanket" spraying, vehicle and tractor encroachment, and grazing. If possible, leave roadsides undisturbed year around.

## \* **Use spot treatment to manage sites for noxious weed control, safety, and snow drifting.**

*Reason:* Where noxious weed control is needed, spot-spraying is preferred because it leaves cover intact, is less costly, and there is less chance of causing nest destruction or abandonment. Spot mowing and/or shoulder mowing may be necessary for improved sight-distance or snow drift control. Complete roadside mowing is costly and often unnecessary.

## \* **Avoid indiscriminate roadside burning.**

*Reason:* Under prescribed conditions, burning can be an effective wildlife management tool. However, widespread and indiscriminate burning of roadsides may remove much needed residual cover as well as valuable roosting and escape cover. Roadside burning can cause a traffic hazard and is not effective in controlling perennial noxious weeds such as thistle.

## \* **Roadsides mowed after September 1st should be clipped "high".**

*Reason:* A **minimum** of 10 to 12 inches of erect, residual cover is vitally needed for next year's early nesters. Residual can also provide some roosting and escape cover.

Urge your local road management officials to adopt policies that will preserve and enhance roadsides for wildlife. For more information, contact your local Area Wildlife Manager or write: Roadsides for Wildlife Program, Dept. of Natural Resources, P.O. Box 756, New Ulm, MN 56073.



## ROADSIDES . . . GIVE WILDLIFE THE EDGE

# ROADSIDE WILDLIFE

Roadsides receive almost continuous nesting use from April through August as shown by examples listed. Disturbance by early mowing, farm tillage, grazing, "blanket" spraying, or vehicle and tractor encroachment during the peak nesting months (May, June, July) will significantly lower production for species that use roadsides for nesting.

## Song Birds and Game Birds: Where and When They Nest

Species	Normal Nesting Period	Nesting Days Per Brood*	Number of Broods Each Year	Nest Description
Pheasant	Mid-April through August	35-50	1	Shallow depression on ground, sparsely lined with grass.
Hungarian partridge	Mid-May through August	35-50	1	Shallow depression on ground, lined with grass.
Mallard	April through July	35-50	1	Hollow on ground, lined with grass and down.
Goldfinch	Late June through August	27-37	1	Cup of woven grass and plant down in weeds or small trees.
Bobolink	Mid-May through July	26-35	1	Shallow cup of dead grass on ground.
Meadowlark	Late April through mid-July	28-34	2	Domed nest of woven grasses with side opening.
Mourning dove	Late April through early September	29-33	2-3	Loose platform of twigs on ground or in tree.
Dickcissel	Early May through July	21-28	2	Loose cup of woven grass on ground or raised in grass tussock or small bush.
Grasshopper sparrow	May through mid-August	24-27	2-3	Hollow cup of grass, rim level with ground or slightly raised.
Vesper sparrow	May through early August	23-32	2	Bulky cup of woven grasses, in shallow depression on ground or in grass tussock.
Common yellowthroat	May through early August	24-28	1-2	Bulky cup of dead grasses with partial hood, built just above ground in grass tussock or small shrubs.

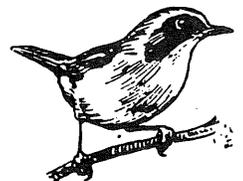
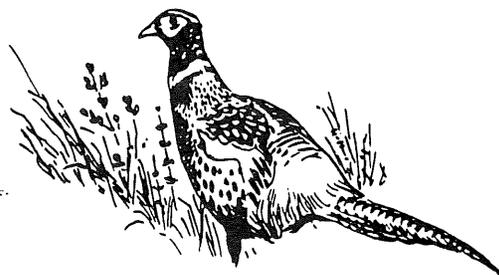
\*Approximate length of time from first egg layed until young leave nest. Nesting periods may be extended if birds are forced to re-nest because nest is destroyed or abandoned.

## Minnesota's Rural And Urban Roadsides Are Used By A Variety of Wildlife Species Including The Following:

**BIRDS:** ring-necked pheasant, gray (Hungarian) partridge, mallard, blue-winged teal, pintail, shoveler, gadwall, common yellowthroat, dickcissel, western meadowlark, red-winged blackbird, mourning dove, bobolink, American goldfinch, killdeer, American bittern, upland sandpiper, eastern field sparrow, grasshopper sparrow, savannah sparrow, and vesper sparrow.

**MAMMALS:** cottontail rabbit, white-tailed jackrabbit, short-tailed shrew, woodchuck, meadow vole, meadow jumping mouse, western harvest mouse, prairie white-footed mouse, pocket gopher, eastern mole, mink, muskrat, thirteen-lined ground squirrel, Franklin's ground squirrel, badger, red fox, raccoon, striped skunk, and spotted skunk.

Roadsides also provide the right combination of abundant food and cover for birds that nest in cavities or in trees near roads. The eastern bluebird and American kestrel commonly use natural cavities or nest boxes next to grassy roadsides. The brown thrasher, eastern kingbird, robin, and common grackle are examples of birds that prefer nests in shrubs or trees near "edges" such as those found along thoroughfares.





# FOR THE TEACHER

## ROADSIDES FOR WILDLIFE TEACHERS GUIDE



ACTIVITIES RECOMMENDED FOR GRADES 7-10

# FOR THE TEACHER

# ROADSIDES BACKGROUND

Good background in question and answer format can be found on the Teacher Data Sheet accompany Activity 1, ROADSIDES AND YOU. A copy is enclosed of the brochure "Roadsides For Wildlife", produced by the Department of Natural Resources for public distribution. Other pertinent manuscripts are enclosed as well as a list of selected references.

## INTRODUCTION HISTORY AND PURPOSE

The Pioneerland Regional Environmental Education Council (REEC) is one of the 13 program units of the Minnesota Environmental Education Board (MEEB). MEEB and its 13 REEC's were created by the legislature in 1973, to assess regional needs for environmental education and to plan and carry out programs to meet those needs. MEEB/REEC is administered by the Minnesota Department of Natural Resources.

The Pioneerland REEC has been concerned for some time with the unused potential of roadsides for wildlife habitat in agricultural southern and western Minnesota. There seems insufficient public awareness of the importance of roadsides to wildlife and insufficient support for managing these grassland communities with wildlife needs in mind. While much information exists in magazine articles and research reports, very little of that data has been incorporated into teaching materials for classrooms.

Deciding to begin with students, REEC undertook to produce a small curriculum for grades 7-10 which would have as its purpose, helping students to become aware:

- That there is a relationship between agriculture and wildlife;
- That roadsides in agricultural regions have a great and largely untapped potential for providing high quality habitat for a variety of wildlife and plant species;
- That, if the above is understood, perhaps attitudes and future behavior can change.

The Roadsides for Wildlife program, with offices at the Region IV, DNR Headquarters in New Ulm, supported the project from first to last, in every phase of its progress.

## ACTIVITIES RECOMMENDED FOR GRADES 7-10

The materials in this packet are suitable for Junior High General Science, 10th grade Biology; or Vocational Agriculture classes. They are meant to fill a gap in available teaching materials; we could find no materials which help students to learn about roadsides and their unique potential as wildlife habitat in agricultural areas.

Each activity is self contained, and none depends for success on others having already been taught. However, there is logic to their order, for those teachers who may wish to teach all or several.

- Activities 2,3, and 4 are awareness and appreciation activities which will increase and sharpen students' observation skills.
- Activities 5, 6, 7, 8, 9, and 10 are field investigations which will add to students' information and understanding of roadside ecology;
- Activities 11 and 12 encourage students to draw upon attitudes and values in making choices. Activity 12 if taught alone would achieve superficial results, and will be more worthwhile if taught after students have gained a certain amount of information and experience;
- Activity 1, a questionnaire measuring knowledge of roadsides, is ideal for those teachers who use a pre-test/post-test method of measuring student learning. It can be taught first in order to discover how much students already know about roadsides, and repeated after several other activities have been taught in order to measure achievement

# SYNOPSIS

The following are brief descriptions of the 12 activities:

## 1. ROADSIDES AND YOU

This lesson is a questionnaire designed to help students gain a sense of their perceptions, knowledge, and concern about roadside habitats. Students administer the questionnaire to others in their community.

## 2. THE GREAT ROADSIDE HUNT

In this lesson students photograph the roadsides near their homes. They use the photographs to construct a map of the roadside communities of their school district. The map will be used to show the school and the community what students are learning about roadsides.

## 3. WINDSHIELD ROADSIDES

Students look for characteristics and features of roadsides through windshields as they travel to and from school on the bus, and/or local car travel, and/or bicycle travel within the community.

## 4. A GREEN GUIDE: MAKING A ROADSIDE VISIBLE

Each team of students will map the plant patterns of a linear section of roadside, creating a large base map of a roadside community.

## 5. ROADSIDE LITTERACY

In this reading and research activity, students investigate some effects of litter on roadside habitats.

## 6. PLANTS IN A ROADSIDE

Students become familiar with some of the characteristics of common roadside plants. They learn about the ecology of specific plants and become more familiar with roadsides as plant communities.

## 7. CROSS-SECTIONING A ROADSIDE

Students investigate a roadside and learn how to make a cross-section. In the process they learn about the composition of a stand of vegetation and the shape of the land.

## 8. THE (OB)NOXIOUS NINE

Students become familiar with some of the adaptations of weeds and discover how the environment of roadsides affects the growth of weeds. The question they explore in their field work is what makes weeds do so well. Later students participate in a value change activity where they consider a typical attitude toward roadside plants, namely that all plants in a roadside are weeds.

## 9. WILDLIFE IN A CHANGING WORLD

Students examine changes in land use and agricultural practices in southern Minnesota from 1940 to 1984. They consider the impact of changing trends in agriculture on wildlife.

## 10. SOME COOL PROJECTS

Individualized, out-of-class, roadside winter investigation problems are posed. Students formulate hypotheses, develop a working plan, perform an experiment/make observations, gather data, display the data in tables/graphs, and make inferences.

## 11. A DISAGREEMENT IN BLOOMING GROVE TWP

In this lesson students become members of a township board. A farmer asks the township board to take an active role in promoting roadsides for wildlife. Students make a decision and discuss it. The lesson concludes with consideration of the effectiveness of actions the farmer might use if the Board rejected the request. The lesson raises questions about private values and community values.

## 12. THE FUTURE IS NOW

How will they know who we were 50, 100, or even 200 years from now? What clues can we leave for great-great-great-great...grandchildren to give them an idea about what our society was like? Students select ten pieces of evidence to represent roadside habitats; five of them for "this is the way roadsides were back then" and five of them for "this is the way I hope they will be for you".

## HOW TO USE

Every activity has a lengthy DISCUSSION section. These are real discussion questions intended to help you place the major responsibility for learning on the students; they ask the students, "What did you learn?" rather than encouraging the teacher to tell the students, "This is what you learned." You can use all of them, some of them, or none of them.

INDEPENDENT STUDY was a consideration in the development of this set of activities. Most Extensions, included at the end of each activity description, can be assigned to individual students or to small student teams. Entire Activity 10, SOME COOL PROJECTS, can be used as an independent study assignment. A SUMMER SCHOOL would be ideal, in that scheduling and seasonal limitations of the regular school year could be circumvented. Finally, these activities should prove to be a rich source of ideas for SCIENCE FAIR PROJECTS.

## ROADSIDE FIELDTRIPPING

These activities emphasize field experience wherever possible. In two activities, students are asked to work in the field, alone, outside class (THE GREAT ROADSIDE HUNT, WINDSHIELD ROADSIDES); in several, they are asked to work in a roadside setting as a whole class (ROADSIDE LITERACY, PLANTS IN A ROADSIDE, CROSS-SECTIONING A ROADSIDE, THE (OB)NOXIOUS NINE, WILDLIFE IN A CHANGING WORLD); and in two activities, students can work in a roadside alone or as a class, (SOME COOL PROJECTS, THE FUTURE IS NOW). All three call for selecting the right roadside for good results, being sensitive to the rights of other people, and taking safety precautions.

## FINDING THE RIGHT ROADSIDE

All the field activities will yield a better educational return if they are conducted in roadsides where the vegetation is less disturbed and more varied. In general, township roads will be more likely to satisfy you, because the steepness and narrowness of their banks discourages disturbance. Many county roads will also suffice, especially if they share a railroad right-of-way. Plan to drive your community's roads with fieldwork needs in mind, and preselect so that the activities will work for your students.

## GOOD MANNERS

Because roadsides are public property you may not think about the need for courtesy toward others. Landowners should be contacted if your students will be working in roadsides abutting their property. You may want to attach flagging to their fences or pound stakes in their land. Even when there will be no use made of their property, they should not have to wonder what your students are doing. And, they might be of help.

## SAFETY

Whereas township roads will likely offer the best evidence of wildlife activity as well as plant variety, they are the least safe. Narrow or non-existent shoulders, ditches deep enough to conceal a seated student, a tendency to distraction—all these make for a potentially dangerous situation. County roads are also potentially dangerous; though usually less so. Here are some suggestions:

- Be sure to discuss safety with the class in advance; repeat the discussion in the field.
- Additional adult supervision might be advisable.
- Flagging, or a similar signal to motorists, could be placed on the road shoulders a distance ahead of the student activity.

In addition to class safety, you will need to be aware of special individual student's needs such as handicaps, allergies, chronic health conditions requiring medications, etc. No student should need to be left behind if good planning has been done.

A special word about POISON IVY. Not everyone is allergic to the plant, but for those who are, the results are agonizing. Make sure you recognize it yourself. There is a drawing of it in Activity 8, THE (OB)NOXIOUS NINE, which the class can study ahead of field trips. You might bring a sample plant to class for examination (eyes only!). Be sure to examine candidate roadsides ahead of class use, and flag any poison ivy plants if there are few; if they are prevalent, find another roadside. The best preventive, however, is to make sure all students recognize the plant.

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# RESOURCES

For additional information, contact:

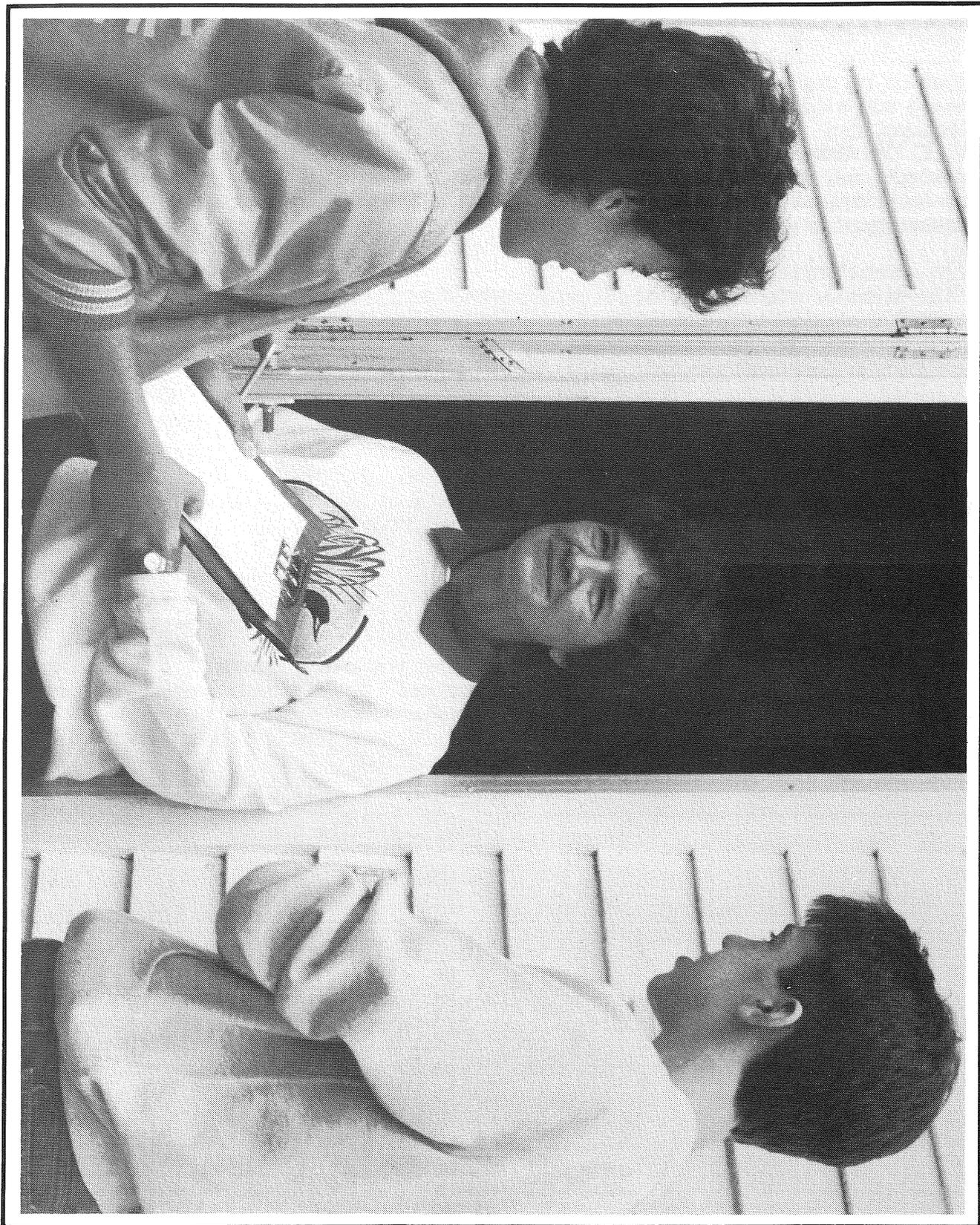
PIONEERLAND REGIONAL ENVIRONMENTAL  
EDUCATION COUNCIL, Box #5  
DNR Building, 500 Lafayette Road  
St. Paul, Minnesota 55146  
(612) 296-2368

ROADSIDES FOR WILDLIFE  
DEPARTMENT OF NATURAL RESOURCES  
Box #756, Highway #15 South  
New Ulm, Minnesota 56073  
(507) 354-2196



# ROADSIDES AND YOU

## ROADSIDES FOR WILDLIFE ACTIVITY 1



**OVERVIEW** This lesson is a questionnaire designed to help students gain a sense of their perceptions, knowledge, and concern about roadside habitats. During the final part of the activity, students administer the questionnaire to other students and adults in their community.

**OVERVIEW** This lesson is a questionnaire designed to help students gain a sense of their perceptions, knowledge, and concern about roadside habitats. During the final part of the activity, students administer the questionnaire to other students and adults in their community.

## OBJECTIVES

After completing this activity, students will be able to:

- describe and appreciate the relationships between the cultural and physical worlds, e.g., human-land relationships;
- determine the degree of community interest and knowledge about roadsides;
- compile, tabulate, and analyze survey results;
- make inferences from data.

## MATERIALS

Student Data Sheet: Roadside Perceptions  
Teacher Data Sheet: Roadside Perceptions

## ACTIVITY DESCRIPTION

1. Give each student a copy of the Student Data Sheet, Roadside Perceptions, and go over the instructions with them. Give them 20-25 minutes to complete the questionnaire.
2. Discuss the students' responses to each question on the questionnaire. As you do, tabulate the responses. Be sure to save this information. You will use it after the class conducts a community survey. The information on Teacher Sheet, Roadside Perceptions, will be helpful to you in conducting this discussion.
3. At this point, discuss these kinds of questions with the students:
  - What benefits do people get from roadsides?
  - How much does this class appear to appreciate roadsides? What is your evidence.
  - What are some ways humans influence roadsides? Which of these are most easy to control? Most difficult to control?
  - If people were more aware of roadsides, do you think roadsides would be different than they are now? In what ways? If not, why not?
  - What is your favorite natural place? In what ways is it similar to a roadside? In what ways is it different?
  - How easy would it be to change our society so that roadsides are appreciated?
  - What are some things that could be done which would make society appreciate roadsides more than they do now?

4. After students have explored these questions, tell them that you want them to find out how much other people in their community know about roadsides. Give each student several copies of the questionnaire. Students should find other students or adults who will complete the questionnaire. Bring these completed questionnaires back to class in three days for discussion. Students should tabulate the results of their survey.
5. Divide the class into groups of 3-5 students and have them compare the results of their survey. A group master tabulation of the survey data should be completed. Students should look for any patterns that emerge from the results.
6. A class master tabulation of results from the small groups should be posted so that all students can see them. Each question should be reviewed with the class and compared with the recommended answers.
7. Ask these questions to lead and focus a discussion of the survey results:
  - How much interest in roadsides do you believe the people you surveyed have? What arguments can you offer in support of your claim.
  - Do you believe the people surveyed have a clear understanding of the issues and problems related to roadsides?
  - What is the significance of roadsides to most people interviewed?
  - If you were writing a feature article on roadsides based on the findings of this questionnaire, how would you write your lead sentence?
  - Do you think most people would notice from one day to the next whether anything happened to a roadside, e.g., it had been mowed, fenced, was being graded, flowers were in bloom?
  - How do you think people surveyed learned about roadsides? How could you find out?
  - How do you think people of your community could become better informed about roadsides?



# EXTENSIONS

1. The following is an exercise which will give your students a way to think about new information this activity may have provided and to clarify for themselves what (if any) alteration this information may have made in their values. Students should work alone and then discuss together.

Should multiple benefits be the goal in managing roadside habitats? Think about the environmental quality of roadsides. Suppose you had 100 points to allocate among the items listed below. How would you distribute them? The most important item should receive the most points and so on. Keep in mind that we are talking about federal, state, county, and township roads.

- a.  Restore roadsides to native vegetation.
- b.  Preserve and protect endangered plants and animals.
- c.  Roadsides should be managed for wildlife.

- d.  Wildflowers and other native plants should be emphasized in roadsides near communities and wildlife habitat at more distant locations.
- e.  Emphasis should be placed on new and upgraded highways.
- f.  Emphasis should be placed on demonstration plots.

Repeat the exercise, only this time ask the class to make the choices they believe their community would make. Compare results with their own.

2. Write a news article for your community paper reporting on the results and implications of your questionnaire. A reporter from your paper might agree to work with the students.

ROADSIDE PERCEPTIONS

Instructions: Instructions for completing this questionnaire are provided with each question. Some questions ask you to circle a response, others ask you to write a few words, and others ask you to fill in the blank.

1. What words come to your mind when you hear the word roadsides?

2. Indicate how strongly you agree with the following statement by circling a number. (1=strongly agree, 5=strongly disagree)

The plants found in roadsides are mostly weeds.      1      2      3      4      5

3. Does the Minnesota Department of Natural Resources have a Roadside Wildlife Specialist, that is, a person to develop and implement a "Roadsides For Wildlife" program for the benefit of pheasants and other farmland wildlife?

Circle yes or no

4. The Management of the highway roadsides listed below is the responsibility of which of the following agencies: Minnesota Department of Transportation (DOT), Minnesota Department of Natural Resources (DNR), County (CO), Township (TWP)? Use abbreviations of those that apply.

- a. Interstates \_\_\_\_\_
- b. State \_\_\_\_\_
- c. County \_\_\_\_\_
- d. Township \_\_\_\_\_

5. It would be best for wildlife if roadsides were mowed: \_\_\_\_\_

- a. twice a year
- b. once a year
- c. every 3-4 years
- d. every 10 years

6. If a person is going to mow a roadside, the best month to do it is: \_\_\_\_\_

- a. May
- b. June
- c. July
- d. August

7. There are more than \_\_\_\_\_ kinds (species) of birds and mammals that use the roadsides as nesting cover. Put the number in the blank.

8. I notice changes that take place in roadsides, for example, plant colors, grass height, flowers, mowing, etc. (circle one) a lot      somewhat      seldom

9. I can name \_\_\_\_\_ roadside plants. Indicate number in the blank. One plant I am sure that grows in roadsides is: \_\_\_\_\_

10. An animal I associate with roadsides is: \_\_\_\_\_

11. If roadsides were managed for wildlife, would wildlife use and production increase, decrease, or stay about the same? (circle one)



Roadsides and You Student Data Sheet (continued)

Page Two

Roadside Perceptions

- 12. The major reason given by farmers for mowing roadsides is: \_\_\_\_\_
  - a. hay
  - b. weed control
  - c. neatness
  
- 13. Under current cash grain farming practices in many regions of Minnesota, roadsides represent most of the significant permanent acreage available to be managed for grassland nesting birds.  
(circle one)      true                      false
  
- 14. If roadsides are managed for wildlife, I would expect road-killed wildlife to increase,      decrease,      remain about the same. (circle one)
  
- 15. Roadsides provide useful winter cover for birds. (circle one)      yes              no



## ROADSIDE PERCEPTIONS

ITEM 1: Answers will vary. This question provides an opportunity to probe student responses. List them on the board and ask students to try categorizing the responses. One might be GOOD AND BAD. Are there any attributes and characteristics of roadsides that are valued? What are they? Are roadsides described in terms of physical characteristics such as objects in them? Are roadsides described in terms of color or how they enhance/detract from the surrounding landscape?

ITEM 2: This is an extremely difficult and interesting question. One way some people think about roadsides is as places where weeds grow. Most wildlife experts would strongly disagree with the statement. Many roadsides are intentionally seeded with long-lived, perennial, grassy species, and naturally seeded with prairie grasses.

Your purpose should be to try to help students clarify what they mean when they refer to plants as "weeds". A weed may be an insignificant plant, any unfamiliar plant, an undesirable, useless, poisonous, or harmful plant, or plants which invade cultivated fields and gardens. Here are some questions which will help guide a discussion about weeds: What do you mean when you use the term "weeds"? How could you find out whether a plant is a weed or not? What are some characteristics of weeds? How are these characteristics different from plants which are not weeds? What are some problems caused by weeds?

Some plants are referred to as noxious weeds. These are plants which may be dangerous to humans and/or domestic animals and/or which interfere in some way with crop production. In Minnesota, the Commissioner of Agriculture has identified nine weeds to be noxious. These are field bindweed, hemp (marijuana), poison ivy, leafy spurge, perennial sow thistle, bull thistle, Canada thistle, musk thistle, and plumeless thistle. In addition to these weeds, there are 47 secondary weeds. The Minnesota Department of Agriculture annually publishes a map which indicates the additional noxious weeds that each county has designated. These weeds, growing on public highways, shall be cut down or otherwise eradicated (chemical treatment or hand/mechanical weeding) as often as necessary to prevent the ripening or scattering of seed and other propagation parts of such weeds.

ITEM 3: The pheasant stamp proposal passed by the Minnesota State Legislature in 1983 called for the hiring of a "roadside coordinator" by the Department of Natural Resources to develop and implement a "Roadsides for Wildlife" program for the benefit of pheasants and other farmland wildlife. The coordination role includes providing technical assistance to various road authorities, landowners, and sportsmen's groups. The office is in the regional headquarters of the DNR, New Ulm, Minnesota.

In 1983, Minnesota pheasant hunters had to purchase a special stamp before they could hunt for pheasants. Its \$5.00 cost is earmarked for special programs designed to improve and enhance this gamebird's habitat across its 64 county range in southern and western Minnesota. Only 10% of the stamp revenues can be spent on administration and personnel; 90% must go into habitat work.

Roadsides and You Teacher Data Sheet (continued)

Page Two

Roadside Perceptions

ITEM 4: State and Federal highways are the responsibility of the Minnesota Department of Transportation (DOT). The Minnesota Department of Natural Resources (DNR) has been working with DOT for several years to improve roadside management practices for wildlife and nongame species.

The counties have responsibility for county roads and the townships, for township roads. They determine and enforce management practices, e.g., mowing and the control of weeds. Virtually all township roads are owned by adjacent landowners.

ITEM 5: Once every 3-4 years. In addition, spot mowing may be needed for safety (visibility) or winter driving reasons (drifting), or to complement neighboring terrain.

ITEM 6: August. Preferably, mowing would be done the last two weeks of August, the least destructive period for pheasant nests. Roadsides are an important secondary nesting site for pheasants when hayfields are mowed in early June.

In normal springs, egg-laying begins in mid-to-late April, with most hens in full egg production or already incubating clutches by the first week in May. At this time of year, new growth of crops is insufficient for nest concealment, and nesting is necessarily concentrated in dead grasses and other cover left over from the previous growing season. Cover types that furnish this type of residual cover include roadsides, fencelines, wetlands and other undisturbed ground. Such cover is critical to the well being of most farmland wildlife. Unfortunately, it is scarce in southern Minnesota today and has drastically reduced the region's capability to support farmland wildlife.

It takes a hen pheasant anywhere from 35 to 45 days to bring off a hatch. If she loses a nest, she may not initiate a new nest immediately. However, assuming that she does initiate a second nest by June 1, it will be mid-July before the eggs hatch. Some pheasants are still nesting even in mid-July or even August. Furthermore, birds such as goldfinches are just starting their nests in early July.

In Spring, 1985, the Minnesota Legislature passed a law (Minnesota Statute 160.232) which places certain restrictions on local governments when mowing highway rights-of-way in order to protect habitat for nesting pheasants and other wildlife. The provisions of the statute are these:

- The first eight feet of grass away from the road surface or shoulder may be mowed anytime.
- However, road authorities may not mow the remainder of the right-of-way until after July 31st except for noxious weed control and for safety reasons.
- The entire right-of-way may be mowed from August 31st to the following July 31st for safety reasons, but not to a height of less than 12 inches.
- Mowing a right-of-way is allowed as necessary to maintain sight distance for safety, and at other times under rules of the Commissioner of Transportation, or by a resolution of a local road authority.

The law does not necessarily prohibit homeowners or farmers from cutting grass along the road, however.

ITEM 7: There are more than 40 species of birds and mammals that use roadsides as nesting and rearing cover. When the species that use roadsides for other reasons are included, the list is much longer.

ITEMS 8 and 9: Answers will vary. Students will become aware that perceptions, knowledge, and concern about roadsides varies from person to person.

ITEM 10: Answers will vary.

ITEM 11: In an Illinois study area, where 90 percent of all roadsides were managed for wildlife, the pheasant population doubled in three years. In south central Minnesota, more nests were established in roadsides left unmowed. Roadsides left unmowed for three consecutive years had two to three times as many nests as those mowed annually.

However, it is difficult, at best, to make such estimates about population increase and to know what they mean. In Minnesota, hunters shoot 300,000 (+ or - 100,000) roosters annually. This represents about 25 percent of the population. It is believed that the pheasant population could be expanded by as much as 500,000 birds through more intensive management of roadside habitat. The point is that there is a real potential in managing roadsides for wildlife and nongame animals.

ITEM 12: A Minnesota DNR survey of 600 landowners (81% return) found that, of those who preferred to mow their roadsides, two-thirds gave their reasons for mowing as wanting it neat. More than 60 percent said they would not mow roadsides if weeds and snow could be controlled.

You may also want to stress an additional point: The disturbance factor. The use of roadsides for off-road vehicles (3-wheelers) or for the turning around of farm equipment at the end of crop rows may be just as damaging to nesting birds as mowing. The amount of cover destroyed by mowing and other types of destruction increased from 36% of roadside acres in 1973 to 44% in 1983. This represents an increase from 192,788 acres to 231,661 acres or 38,873 acres.

ITEM 13: Throughout much of the cash grain farming areas of Minnesota, roadsides represent the most significant permanent acreage available to be managed for grassland nesting birds. The major portion of our countryside today is dedicated to the growing of row crops (corn and soybeans) and acreages of undisturbed, natural cover have declined about 80% since the late 1950's.

Across the pheasant range, it is estimated that there is more than half a million acres of roadside. This represents potential nesting habitat. It is only 2% of the actual land area but it is a substantial acreage that can be depended on. There is going to be some kind of grassy cover year after year, and it is well distributed. However, about 64 percent of the roadside segments are mowed too early (before August 1st) to help wildlife.



# THE GREAT ROADSIDE HUNT

ROADSIDES FOR WILDLIFE

ACTIVITY 2



**OVERVIEW** In this lesson students photograph the roadside communities near where they live. They use the photographs to construct a map of the roadside communities of their school district. The map will be used to show the school and the community what students are learning about roadsides.

# THE GREAT ROADSIDE HUNT

## ROADSIDES FOR WILDLIFE ACTIVITY 2

**OVERVIEW** In this lesson students photograph the roadside communities near where they live. They use the photographs to construct a map of the roadside communities of their school district. The map will be used to show the school and the community what students are learning about roadsides.

### OBJECTIVES

After completing this activity, students will be able to:

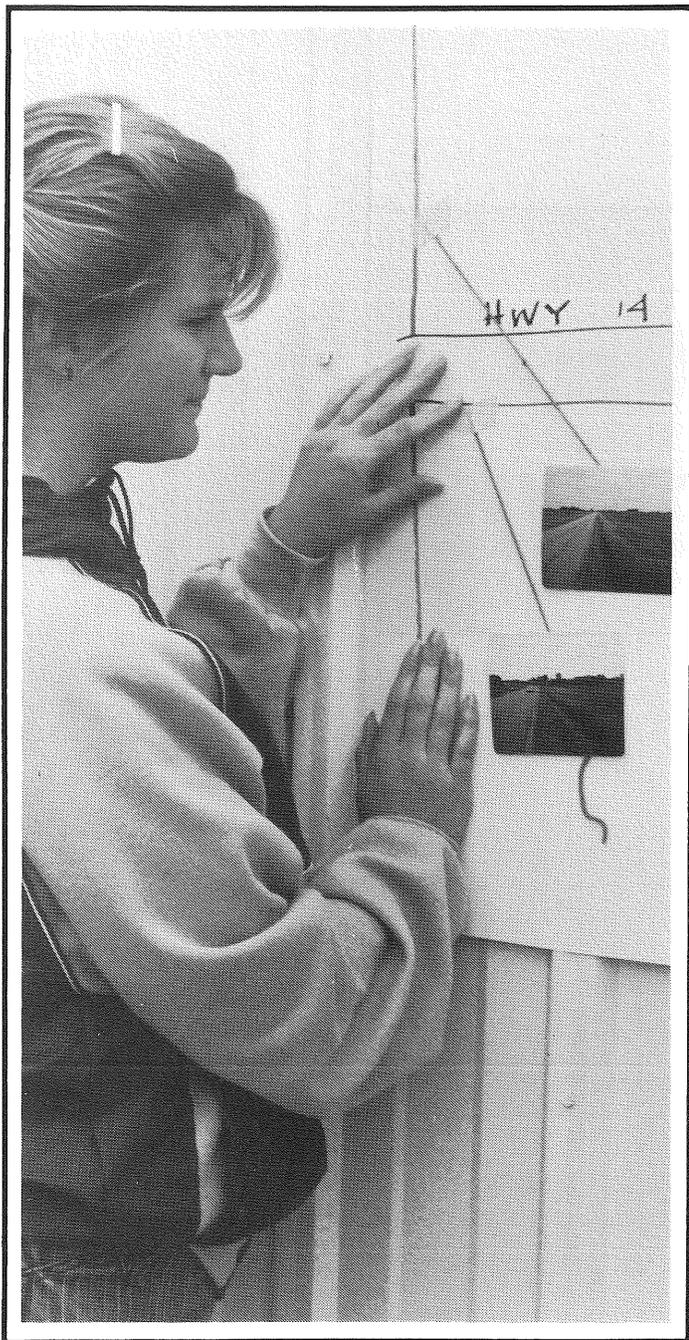
- describe the range of roadside habitats in their community;
- distinguish observations which are relevant to the solution of a problem from those which are not;
- understand that people may have different attitudes toward roadsides;
- demonstrate knowledge of the persuasive function of visual media as it is used to promote beliefs or influence behavior;
- produce visual images with a particular function.

### MATERIALS

School District Map  
Butcher paper/newsprint ("cheap sheets")  
Cameras  
Fabric  
Yarn, knitting

### ACTIVITY DESCRIPTION

1. Tell students, "If you had a chance to let other students, faculty, and parents, know about what the roadsides of our school district look like, what pieces of photographic evidence would you show them?" As students begin making suggestions list them on the board. Encourage a short discussion of the characteristics they identify. These are some questions to help guide this discussion:
  - Within the school year, is there a "best" season to conduct this work? What are some of your reasons?
  - What are the advantages and disadvantages of color film? Of black-and-white film? Which should we use and why?
  - What kinds of photographs should we use? Close-ups? Medium or long range? Why?
  - How will we know that we have a "representative" collection?
  - What do we want viewers of our display to know (e.g., kinds, diversity, plant types) and/or feel?



3. When the photographs have been developed and selected they should be attached to a school district map. Use an enlarged school district map drawn on newsprint or a regular sized county or school district map. To indicate the location of the photograph, tape a piece of yarn from the photograph to the roadside. Encourage students to indicate the type of roadside, e.g., township, county, state highway, interstate.

Here is an easy way to enlarge a map accurately: Rule a grid over the map, e.g., 1" square. Then, on a larger paper, rule a grid 3", 6", 9", or 12" square, and have students transfer the information from the small square to the larger square. If you want to keep the entire class at work, each student could complete one square and paste them in place when finished.

4. Be sure to admire the completed map. If you can, post it where it is visible to other students and/or use it for a parents' night.
5. Summarize this activity by asking students these kinds of questions.
  - Carefully examine the evidence we collected. Now write a one-sentence summary of what this piece of work is saying. Then summarize it in a word. Have the students read some of the descriptions. Are they more similar than different or more different than similar? How do you explain this?
  - Print the word "ROADSIDE" vertically on the board. Across from each letter ask students to write a word beginning with that letter that describes a characteristic of roadsides. Is each word a summary of all roadsides or does it apply to only certain roadsides?
  - How many different kinds of roadsides are there? How many ways can they be categorized?
  - What does this assignment tell you about your community?
  - Using the data we collected, why are roadsides different? What are some hypotheses or guesses to explain the differences you observe? What evidence would you need to collect to prove your hypothesis?

2. Point out the physical boundaries of the study site. Tell students that the collection of data for this investigation is to take place in the outdoor laboratory near where they live. Each student should take at least one picture of a roadside. Students should note where each photograph is taken.

## EXTENSIONS

1. The roadsides in your community have probably changed a great deal over the years. Try to locate old photographs of the same places. Try the county historical society and/or older members of the community. They might bring picture collections to class and talk to students about what and why changes have taken place.

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ROADSIDES FOR WILDLIFE  
A Supplementary Curriculum  
Produced By

The Minnesota Environmental Science Foundation, Incorporated  
for the  
Pioneerland Regional Environmental Education Council  
and the

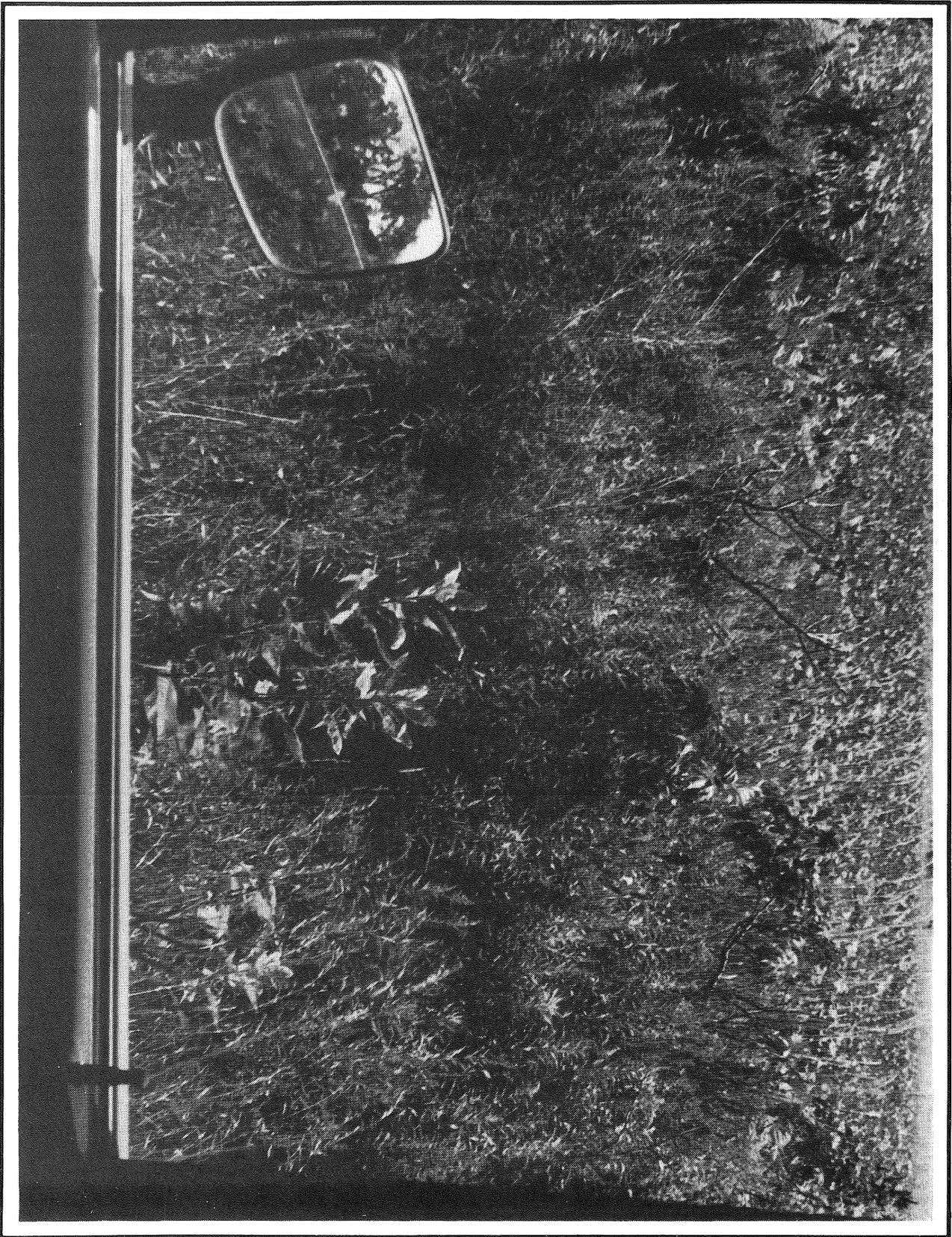
Minnesota Department of Natural Resources, Roadsides For Wildlife Program

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# WINDSHIELD ROADSIDES

ROADSIDES FOR WILDLIFE  
ACTIVITY 3



**OVERVIEW** Roadsides may be as little noticed as any feature of the landscape. Linear and narrow, they occupy a strip of land between a human travel lane and fields and woods. They go by so fast. Students look for characteristics and features of roadsides through windshields as they travel to and from school on the bus, and/or local car travel, and/or bicycle travel in their community.

**OVERVIEW** Roadsides may be as little noticed as any feature of the landscape. Linear and narrow, they occupy a strip of land between a human travel lane and fields and woods. They go by so fast. Students look for characteristics and features of roadsides through windshields as they travel to and from school on the bus, and/or local car travel, and/or bicycle travel in their community.

## OBJECTIVES

After completing this activity, students will be able to:

- see rather than merely look;
- understand that everyone makes visual decisions in daily life, not only in our choices of material things, but also in what we choose to see;
- discern aesthetic qualities in natural and human-made environments.

## MATERIALS

Student Data Sheet: Side Finds



# ACTIVITY DESCRIPTION

1. Make a copy of the "Side Finds" data sheet for each student/student team. You can give students all of the challenges, or select those that are appropriate for your school district and group, and/or include some of your own.

2. After an appropriate period of time, ask each student/student team to discuss their "collections".

3. Discuss this activity by asking students these kinds of questions:

- Do you think most of us see or look at roadsides? What is the difference? What are some of the reasons?
- If we really saw roadsides, do you think they would change? If yes, how? If no, why not?
- Do roadsides look pretty much the same, no matter where they are? Does anyone else have a different opinion?
- What are some environmental factors which influence roadsides? Which of these are influenced by the activities of humans?
- What was an item you added to your list for others to look for? Why did you add it? How did it catch your attention? Did you have any kind of person in mind when you added it?
- How are the data collected in this investigation similar to data collected in a laboratory investigation/field study? Different?
- Which was the most difficult item to find? Were any impossible?

4. Ask students to complete the following sentence stems on a separate sheet of paper. Collect them, mix them up, and then read a few of the responses.

a. When it comes to roadsides\_\_\_\_\_

\_\_\_\_\_

b. Most people think roadsides are\_\_\_\_

\_\_\_\_\_

c. When I see roadsides, I\_\_\_\_\_

\_\_\_\_\_

d. Roadsides should\_\_\_\_\_

\_\_\_\_\_

e. The word which best describes roadsides is\_\_\_\_\_

\_\_\_\_\_

f. Ten years from now, roadsides will be\_\_\_\_\_

\_\_\_\_\_

g. Ten years ago, for me, roadsides were\_\_\_\_\_

\_\_\_\_\_

h. People use roadsides to\_\_\_\_\_

\_\_\_\_\_

After students have listened to a few responses, ask:

- What attitude about roadsides was more commonly expressed? Positive, negative, or were both responses equally common? What are some possible reasons?
- Do you remember roadsides from when you were six or seven years old? What do you remember? Were you a better seer then? Poorer? Can you think of reasons why?

# EXTENSIONS

1. Imagine stopping the bus or car and walking the roadside instead. Working in teams ask the students to use the same data sheet format, and create a second one with statements suited to walking observation. Exchange data sheets and repeat the activity. Discuss the experience:
  - What differences were there between the first experience and the second in terms of looking vs seeing? Is it easier to see when walking, or is it about the same? If we walked more would we see more? Or would we merely look more slowly?
  - What differences were there in the kind of observations asked for? Were any of the original statements retained? Which ones? Or did teams forget to consider "SIDE FINDS" items?
  - Did any team ask for an observation no other team thought of? Was there any observation asked for on several or nearly all data sheets?

### SIDE FINDS

As you travel to and from school by bus or travel by car and bicycle in your school district, try to find the following items. Keep notes on your finds. Record what, where, and when:

Find at least five different signs on roadsides.

Find birds using roadsides.

Find examples of erosion.

Find a culvert.

Find a mammal using roadsides.

Find a tree in a roadside.

Find a wet roadside.

Find flowers in a roadside.



Windshield Roadsides Student Data Sheet (continued)

Page Two

Side Finds

Find a roadside being used for recreation.

Find shrubs in a roadside.

Find a roadside where plants are damaged by humans.

Find evidence that humans use roadsides.

Find a roadside change.

Find a roadside that makes you say, "Wow, that's beautiful" (or equivalent).

Find a difference between a roadside on an unpaved road and a roadside on a paved road.

Find at least five different colors in a roadside.

Find...

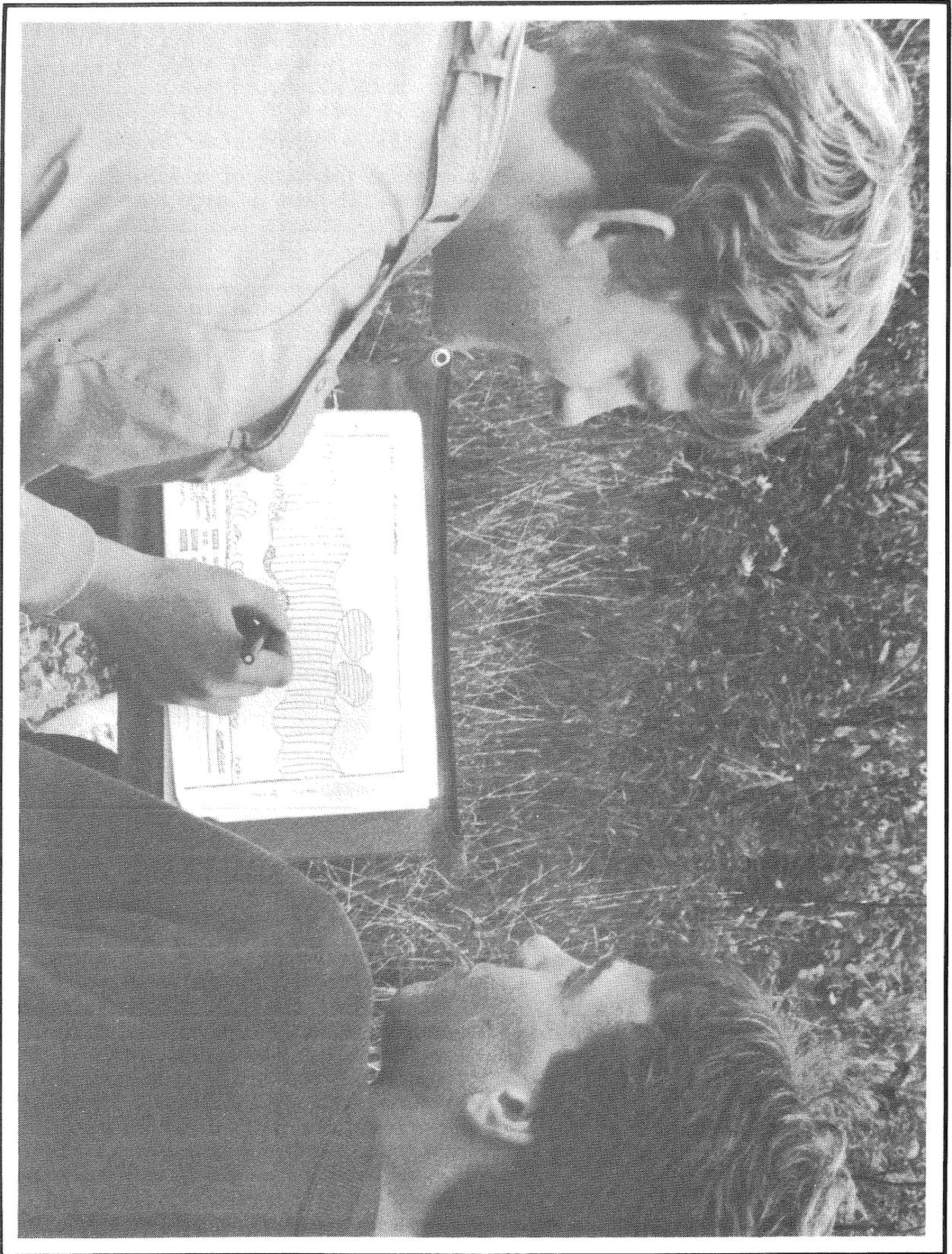
Find....

Find....



# A GREEN GUIDE: Making a Roadside Visible

ROADSIDES FOR WILDLIFE  
ACTIVITY 4



**OVERVIEW** Each team of students will map the plant patterns of a linear section of a roadside community. When they are finished students will have a large base map of a roadside community. They will use the map to discuss plant patterns and characteristics of their roadside community.

# A GREEN GUIDE

## Making a Roadside Visible

# ROADSIDES FOR WILDLIFE

## ACTIVITY 4

**OVERVIEW** Each team of students will map the plant patterns of a linear section of a roadside community. When they are finished students will have a large base map of a roadside community. They will use the map to discuss plant patterns and characteristics of their roadside community.

### OBJECTIVES

After completing this activity, students will be able to:

- map the major features of a roadside study site;
- discuss ways in which maps contribute to our understanding of places;
- demonstrate understanding of field maps and their components;
- discuss the value of devoting attention to the supposedly commonplace, everyday aspects of spatial experiences in order to see them freshly.

### MATERIALS

Student Data Sheet: A Bird's-Eye View of Roadside

Clipboard/Hard Writing Surface

Paper

Pencils

Rope/String—knotted to mark the length of each team's study area

Forester's tape/cloth strips

Optional: Envelopes for collecting indicator plants; compasses; meter sticks to measure plant height; lath; hammer.

### PREPARATION

1. Some advance preparation by you will be necessary before the students go to work. The following is a checklist you can use.

When you have selected a roadside study area, talk with the adjacent landowner(s) so that they know what you are doing. Obtain permission to use their fence to tie "flagging" material.

Decide upon the size of the study area to be mapped depending on class size and your ability to supervise the class while they are in the field. The linear segments chosen for each team can be ten to twenty meters long. The size of the segments depends on the diversity of the site. Try to provide some for each team.

If you decide to map a long section get some help supervising the class.

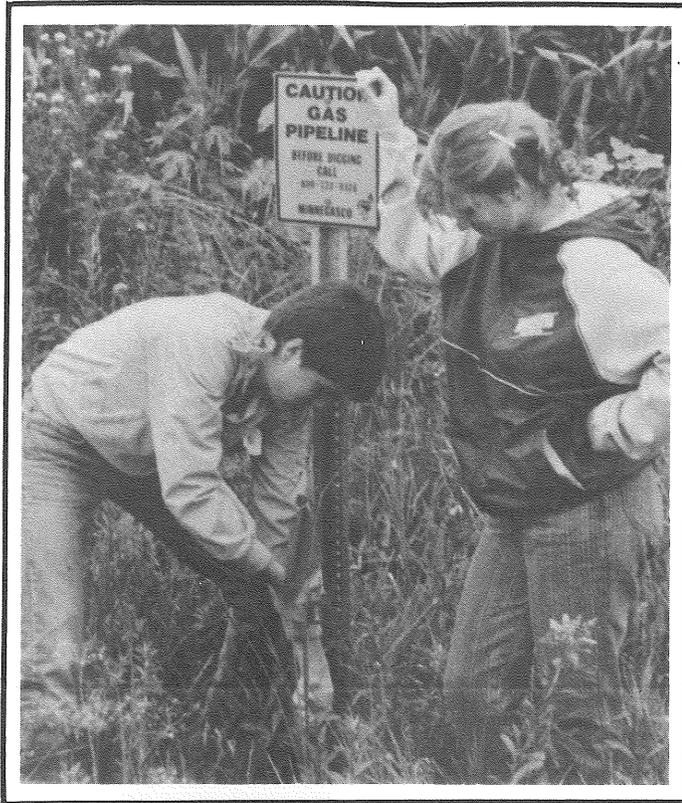
If you choose, plan to divide the class into two major groups with each one responsible for opposite sides of the road.

Construct a key. The key should include ten biological/environmental features of the site. Some examples include: bird nests, ant hills, gopher holes, grasses, narrow-leaf plants, broadleaf plants, shrubs, mosses, bare ground, etc. Special features, e.g., drain tiles, culverts, telephone poles, litter, signs, can be noted directly on the maps.

2. Either make a data sheet with the key for each team or discuss the key before you go into the field and have teams copy the symbols into the spaces provided on Student Data Sheet, "A Bird's-Eye View of Roadside".

Collect a few representative samples of roadside plants to have ready for class discussion of the key.

- Use a knotted piece of string or rope to delineate each team's study site. Use forester's tape or strips of cloth to mark each division of the roadside site. Tie these flags to the fence or to wooden stakes.



## ACTIVITY DESCRIPTION

1. When you are on the site, point out boundaries, and review field work rules.
2. Divide the group into teams of two to three, and give each team a copy of the data sheet, "A Birds-Eye View of Roadside". Number each team in order of placement.
3. Review the key, and tell students how you want special features placed on the maps.
4. Ask students to map the major features or the patterns of their study site. Students will discover that it is difficult to completely agree upon the boundaries for each feature used in the key. Each team is to make the best decision it can based on similarities and difference.
5. When you return to the classroom, tape the maps together and post them on the wall. If you mapped both sides of the road, place them on opposite sides of the room.
6. Summarize this activity by asking students these kinds of questions:
  - What is the most common pattern? The least common pattern?
  - If you visited this study area next year and remapped it, would you expect it to show the same pattern or would it be different? Ten years from now?
  - What can you say about the effects of people on this roadside?
  - What are some reasons certain plant patterns and distributions are located in different areas, i.e., what are some environmental variables that appear to influence the plant community you studied?
  - As you worked you may have noticed some evidence of animal use. In what kinds of ways do animals appear to use this roadside?
  - If you were to direct someone to find your section of the study site in the field, what characteristic do you think would be most helpful?
  - If you were to remap this study site, what would you do to improve the mapping technique?
  - If you were interested in knowing what this roadside looked like 10 years ago or 50 years ago, what are some ways you might be able to find out?
  - What are some things a person unfamiliar with roadside communities could learn from this map?
  - If both sides of the road were mapped, ask students whether they are similar to or different from one another. What might account for this?

# EXTENSIONS

1. Symbols are often used to indicate location. The Eiffel Tower means Paris, just as the Statue of Liberty means New York. Large red pines/white pines can mean Northern Minnesota. What symbol would you use for your part of the world? Your town/city? Your agricultural region? A roadside habitat?
2. A few members of the class might map a segment of a typical Federal highway, and report back to the class. After comparisons have been made between these new maps and the original maps, discuss why there is a difference in plant variety; give students a chance to discuss their preferences.
3. One of the discussion questions reads, "If you were interested in knowing what this roadside looked like 10 years ago or 50 years ago, what are some ways you might be able to find out?" Make this question a class assignment or an independent study assignment.

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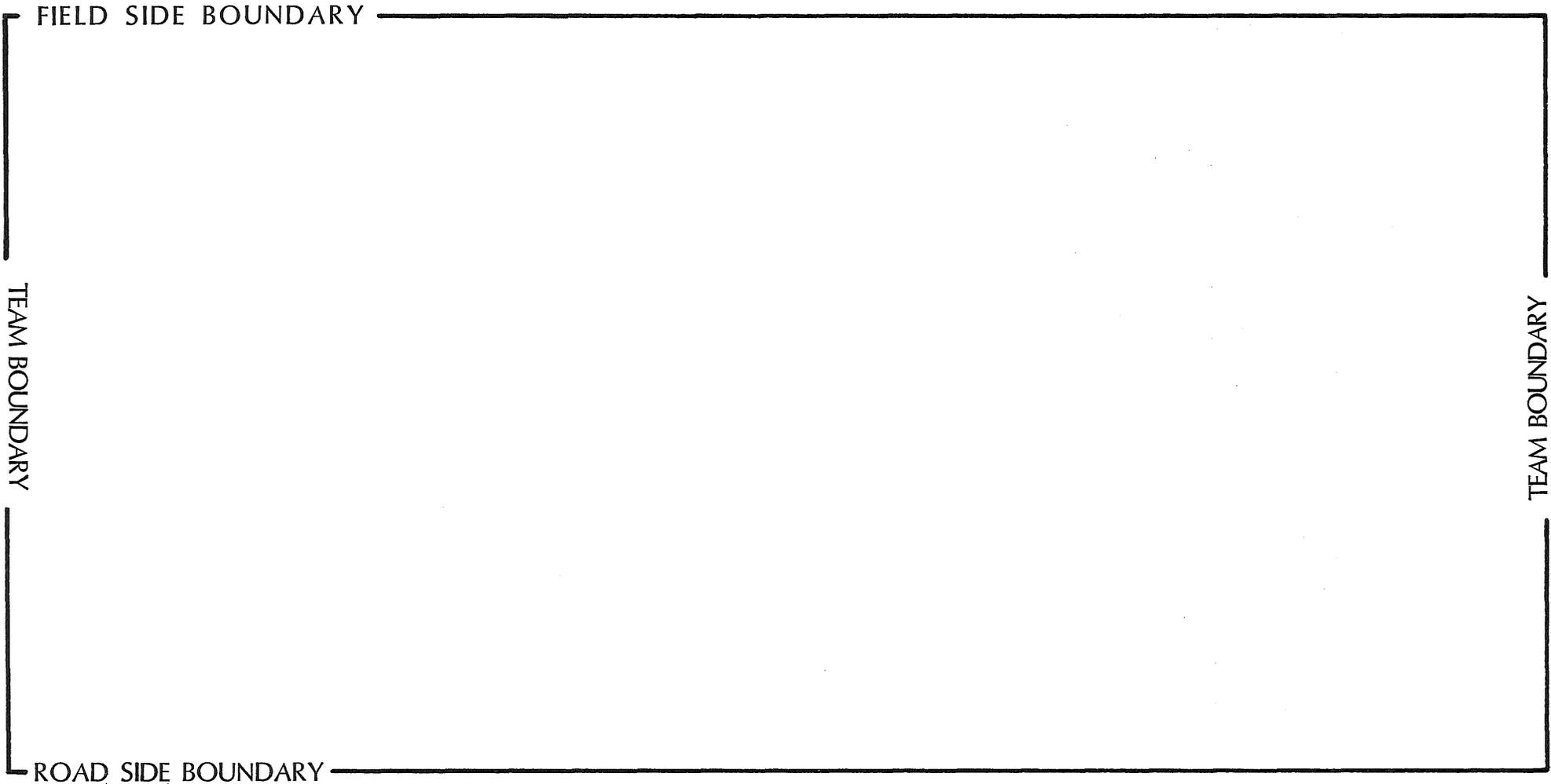
The Minnesota Environmental Science Foundation, Incorporated  
for the  
Pioneerland Regional Environmental Education Council  
and the

Minnesota Department of Natural Resources, Roadsides For Wildlife Program

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# A BIRD'S EYE VIEW OF ROADSIDES

Field Cover Type



KEY	
<input type="checkbox"/>	_____

Team Number: \_\_\_\_\_ Team Members: \_\_\_\_\_

Indicate N on this map with an arrow.  
Indicate side of road you worked on with a letter,  
N, E, S, or W: \_\_\_\_\_  
Note any unique features directly on the map.



# ROADSIDE LITTERACY

## ROADSIDES FOR WILDLIFE ACTIVITY 5



**OVERVIEW** In this reading and research activity, students investigate some effects of litter on roadside habitats.

**OVERVIEW** In this reading and research activity, students investigate some effects of litter on roadside habitats.

## OBJECTIVES

After completing this activity, students will be able to:

- identify central and supporting elements in information;
- summarize information;
- identify and describe environmental factors;
- describe how organisms in roadsides use litter;
- infer the range and optimum of several environmental variables for animals.

In the early 1940's, a graduate student at the University of Chicago, the ecologist Lamont C. Cole, did his Ph.D. thesis on a portion of the cryptozoic fauna as defined by Dendy. Cole distributed 369 well-seasoned oak boards on the forest floor of a small woodland to learn more about their niche. According to Cole, the organisms which inhabit the cryptozoic niche under boards "are refugees from physical conditions or from biotic factors of predation or competition in the outside environment".

## PREPARATION

Site. Choose a roadside site that contains a diverse array of litter. Contact adjacent landowners so that they will know about the field work and to obtain any necessary permission, e.g., to use their fences to attach flagging material. Mark the boundaries of the study area with flagging.

Litter. You must decide what you are going to do with the litter. Are you going to collect it or leave it? If you choose to collect it, you will have to plan for disposal.

Safety. Ask students to bring a pair of work gloves or old socks for handling cans, other metal objects and glass. Plan to have a small first aid kit with you.

## MATERIALS

Student Data Sheet: Roadside Trash  
Collection: A Family Affair  
Student Data Sheet: Litter Critters  
Evaluation Sheet: Factoring the  
Environment  
Work Gloves  
Magnifiers  
Examination Containers, e.g., milk-carton  
halves

In 1895, A. Dendy coined a new term to describe "the assemblage of small terrestrial animals found dwelling in darkness beneath stones, rotten logs, the bark of trees, and in other situations." This term, "cryptozoic fauna" (or "cryptozoa"), has never been widely used although its meaning was later extended by biologists to include all animals that avoid daylight, i.e., crepuscular, nocturnal and subterranean forms.

## ACTIVITY DESCRIPTION

1. Introduce this lesson by having students read and discuss "Roadside Trash Collection: A Family Affair". These questions will help guide the discussion:

- How is litter defined in this article?
- Have you ever picked up litter without supervision or incentives of some kind?
- The fact that people litter in the first place indicates that something has been gained in the process. What do you think are some reasons people litter?
- Do you think that local residents are less sensitive to litter problems than visitors? What is your reason?
- Which would you be more interested in investigating, the effects on plants or the effects on animals? What could you do to find out?

2. Divide the class into teams of two or three before you go into the field. Distribute a copy of "Litter Critters" to each team and review it with them. Students are to list the kind of litter, describe the environmental factors and record evidence of the effects of litter on organisms. There are spaces on the data sheet for students to make some notes about each category.

**LITTER.** Students make and record their observations. The item is to be listed before it is disturbed.

**ENVIRONMENTAL FACTORS.** Is it wet, dry, moist, in, on and/or under the piece of litter? Is it sunny, shaded, protected from or exposed to the wind? Does the litter or ground feel warm or cool? These descriptions should be done as carefully as possible.

**EVIDENCE OF EFFECTS OF LITTER.** This includes the presence of organisms in, on and/or under the litter, eggs, holes and tunnels, etc. Where possible students should pull apart and shake the litter into their collecting containers and examine the animals. If students don't find any evidence of organisms they are to record this. Students should look at the ground, at the litter, and in the litter. Be sure students record/make estimates of any numbers.

Students should list the animals they know and, for unfamiliar ones, encourage them to use descriptive names such as worms, worm-like, insects, shellless snails, spiders, bugs, etc.

You may want to say something about lifting and removing items quickly so that students can count all the animals visible both on the surface of the ground and those adhering to the under surface of the item. Some species move faster than others and for some animals it will not be possible to accurately count them. When in doubt, estimate, but note that it is an estimate.

3. When you are back in the classroom, work with the field data:

- When the environment of an organism is changed, there may be a response by the organism. When we were in the field what changes and responses did you observe?
- Put the following diagram on the board. Pick two organisms observed in the field. Identify one with an X, the other with an O. Which places would these organisms be found? Use different symbols for two other organisms and ask students to place them. What are some inference you can draw from these data?



Repeat the diagram for: **MOISTURE** (moist...dry), **TEMPERATURE** (warm...cool), **WIND** (unexposed...exposed).

- Put the word LIFE on the board and below it, head two columns with the words PRESENT and ABSENT. Have students state litter items which go under each heading.
- Evaluate what students know about environmental factors, by giving them a copy of "Factoring the Environment".

4. Conclude the lesson by asking some of these questions:

- What are the most common items? The least?
- Are all items used by some kind of organism?
- What are some different ways organisms use litter?
- Are there any organisms which are associated with all kinds of litter?
- What environmental factors appear to be important for organisms which use litter?

- Habitat is the place where organisms live. Is human-made litter habitat? How is it like natural habitat? Different from natural habitat?
- What if someone were to suggest, based on our findings, that it is obviously all right to litter roadsides. After all, litter provides shelter and food for a great variety of organisms. What would you say?
- What would happen to these organisms if roadsides were not littered?

## EXTENSIONS

1. Set out some more-or-less permanent mini-habitats of your own of different sizes and materials (wood boards, pieces of cardboard, plastic sheeting/containers). What organisms use the litter? Can you tell whether it is for shelter or food or both or...? Are the organisms the same as the ones you found using roadside litter or are they different? What is the effect on plants? What do you think would happen if you left these mini-habitats over winter?
2. Find out the optimum levels of several environmental factors for one of the organisms you discovered in litter. Does the animal prefer a wide or narrow range of temperature, moisture conditions, and light conditions?
3. Find out which kind of litter an organism prefers when it must select from a number of pieces of litter. For example, conduct a trial using all brown-colored litter such as plastic, paper, metal, and wood. If you discover a color preference, try to change the color preference by changing the color.

4. During his first term as Minnesota's Governor, Rudy Perpich tried to call attention to the litter dilemma by encouraging government agencies, at all levels, not to clean up litter along the roadsides. Governor Perpich wanted to "let the public see how bad it is". The idea was that citizens would have a chance to experience how much litter accumulates in a short period of time.

Ask your students, "What do you think of this as an exercise in litter awareness? What affect do you think it would have on roadside littering? Would it increase, decrease, or remain about the same? What should be done about the litter dilemma?"

If your class divides on this issue, form two sides. Give each side about five minutes to prepare reasons in support of their position. Have a person from each side state its point of view. See if you can come to some kind of agreement.

- What are the positive and negative factors which might be weighed?

ROADSIDES FOR WILDLIFE  
A Supplementary Curriculum  
Produced By

The Minnesota Environmental Science Foundation, Incorporated  
for the  
Pioneerland Regional Environmental Education Council  
and the

Minnesota Department of Natural Resources, Roadsides For Wildlife Program

### ROADSIDE TRASH COLLECTION: A FAMILY AFFAIR

"This is a report of a modest effort to keep one short stretch of Minnesota highway clear of trash and, incidentally, to document the nature of the trash our family finds there each year. The segment is 700 feet of the Lake Superior side of Minnesota Trunk Highway 61, about three miles southwest of Grand Marais. There is nothing special about the stretch of road--no public driveways, no places where motorists park, no picnic areas.

"Our data is the trash we pick up and count along one side of this road. We collect the litter each year near Memorial Day, late enough so the snow is gone, early enough so new grass doesn't hide the treasures.

"In 1969, our first year, we collected the total accumulation of trash from past years. We didn't count individual objects, but the entire collection of metal and glass weighed 850 pounds. If that was a typical inventory, it is suggested that more than six tons of old trash lined each mile of Highway 61 that year.

"In 1970 and 1971, we found more old trash. Beginning in 1972, however, our annual collection included only new things--that is, objects thrown from passing vehicles during the past year.

"Since 1972, we have picked up an average of more than 56 bottles and cans along one side of that 700-foot stretch of highway each year. In addition to the bottles and cans, which are easy to identify and count, we collected 40-50 pieces of other junk each year, mostly plastic items.

"If the collection site is typical of the total area, there are over 850 bottles and cans per year per mile thrown from vehicles traveling Highway 61 near Grand Marais."

SOURCE: Dean Abrahamson, "Spring's Roadside Harvest", The Minnesota Volunteer, January-February, 1980, pp. 58-59.

1. Main ideas are the most important ideas of a paragraph or reading. Identify the main ideas by circling them.
2. Supporting details provide information about main ideas of a paragraph or reading. Identify the supporting details by underlining them.
3. Write a one sentence summary of this reading.
4. What is the most important thing you have learned from this reading?



ROADSIDES FOR WILDLIFE, Activity 5  
ROADSIDE LITTERACY  
STUDENT DATA SHEET

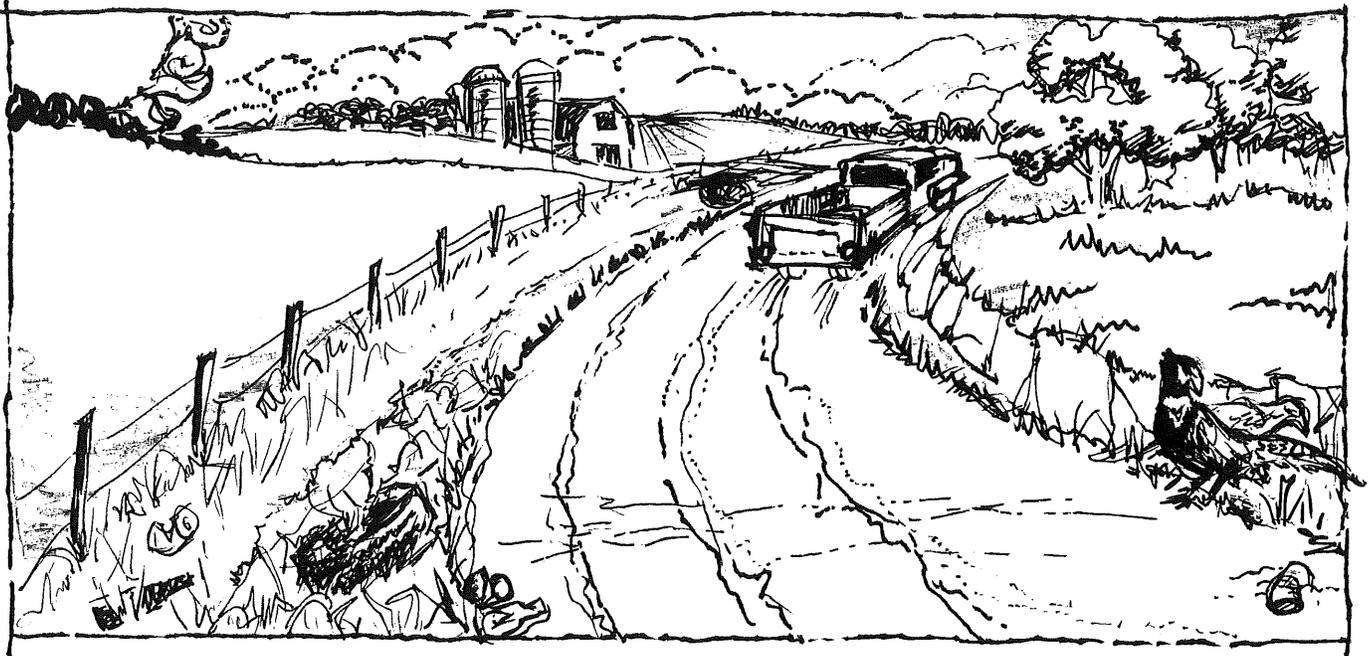
LITTER CRITTERS

Date: \_\_\_\_\_  
Student Team: \_\_\_\_\_  
Team Members: \_\_\_\_\_  
\_\_\_\_\_

LITTER	ENVIRONMENTAL FACTORS	EVIDENCE OF EFFECTS
Notes	Notes:	Notes:



FACTORING THE ENVIRONMENT



1. What environmental factors might influence this roadside habitat?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. There are two kinds of environmental factors. Biotic factors are those from organisms. Abiotic factors are those from the physical environment. Which of the environmental factors are biotic and which are abiotic?

Biotic Factors

Abiotic Factors

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# PLANTS IN A ROADSIDE

ROADSIDES FOR WILDLIFE  
ACTIVITY 6



**OVERVIEW** Students become familiar with some of the characteristics of common roadside plants. They learn about the ecology of specific plants and become more familiar with roadsides as plant communities.

# PLANTS IN A ROADSIDE

# ROADSIDES FOR WILDLIFE ACTIVITY 6

**OVERVIEW** Students become familiar with some of the characteristics of common roadside plants. They learn about the ecology of specific plants and become more familiar with roadsides as plant communities.

## OBJECTIVES

After completing this activity, students will be able to:

- Make statements supported by evidence about findings, or ask additional questions;
- collect quantitative evidence of differences and similarities;
- describe how the environment of a roadside affects the growth of plants;
- offer possible explanations for observations that seem curious.

help you scout. However, those six plants are typical of less-disturbed, fall roadsides, and they may not match your needs. If they are not helpful, substitute drawings of your own choosing.

When you have chosen a site, talk with adjacent landowners to inform them about your work and to obtain permission to use fences for flagging team study plot boundaries. Subdivide the roadside into study plots with flagging material. As a general guide, each team should have a study plot about 10-20 meters long.

## MATERIALS

For Each Team:

Meter Stick

Six Envelopes/baggies/bags

Magnifier

Student Data Sheets - Vegetation Study Field Sheets; set of six, with drawings

For The Class:

Flagging

Student Data Sheet - Vegetation Study Field Sheet; one, no drawing

## PREPARATION

In order to increase your students' chances for a successful and interesting experience with this activity, you will need to scout your community's roadsides carefully. Try to find a study site with good plant variety, preferably one which has been little disturbed. The sketches included on the Student Data Sheet will

## ACTIVITY DESCRIPTION

1. Before you go into the field you will want to discuss and clarify some of the items on the "Vegetation Study Field Sheet".
  - a. ITEM 2. Abundance. Students should reach agreement, through discussion, about the measure of abundance to be represented by each letter, Vegetation Study Field Sheet, Item 2. This will make the team observations comparable.

The following are several suggested alternatives:

- Coverage: (D=plants cover 100 percent of the plot; A=plants cover over 75 percent of the plot; F=plants cover about 50 percent of the plot; O=plants cover about 25 percent of the plot; R=fewer than five plants on the plot);
- distance between plants: (D=2.5 cm apart; A=15 cm apart; F=9 cm apart; O=1.5 m apart; R=fewer than five plants on the plot);

- number of stems of each species touching the meter stick (2-3 random tosses);
- number of individuals per square meter (2-3 sample plots);

b. ITEM 3. Variable Characters.

Students should reach agreement on what variable plant characters they are going to measure, e.g., leaf shape, leaf size (width or length), plant height, leaf pattern, seed size, seed number.

If you can, have a collection of leaves so that students can investigate the concept of variation. Dandelion or plantain leaves are especially good because they are easily found and their leaves vary widely in size (width and length). Collect two samples, each, of 100 leaves, from different locations: 1) shady, protected, and 2) an open lawn or playground (frequently mowed/trampled).

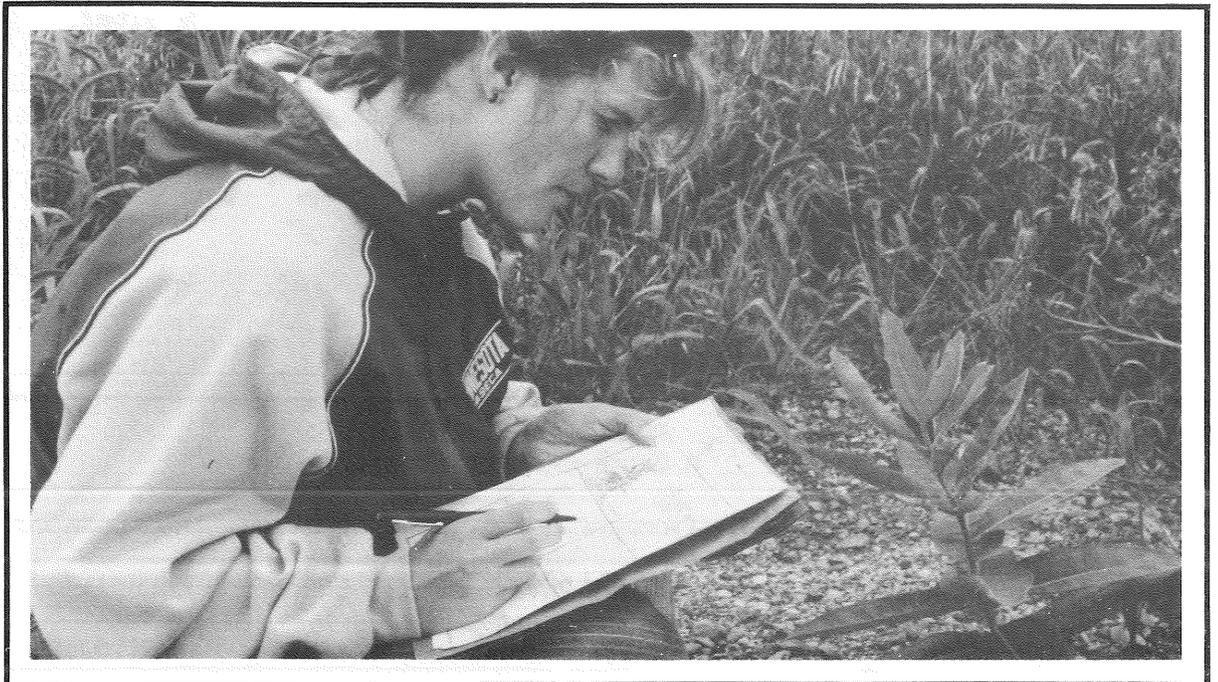
Have students measure the leaves and then use the board to make a class histogram of the data. Histograms are graphs that show how many objects exhibit some value of a variable. Ask students to suggest labels for the x and y-axes. The x-axis will read width/length of leaves in mm. The y-axis will read number of leaves measured.

The necessary range of the y-axis can be obtained by asking a student for a number, then by asking whether anyone has a larger number. Continue until you obtain an upper limit. Place this range of numbers--be sure to add two or three more at each end of the range--in equal intervals on the histogram. Enter this data with an X. (If you use two different collections of leaves use an O to represent these data.)

c. ITEM 4. Animals Using Plants.

There are a number of discoveries students can make. They should examine leaves and stems for damage. Encourage students to speculate about different uses: food, shelter, reproduction, etc. Students should note the different ways animals damage plants. Plant parts are bitten and mined. Some animals cause unusual growths or markings in plants. Shrubs may show evidence of rabbit chewing. Small mammals may bite and topple stems at ground level.

The class also needs to reach agreement on the size of the sample. It should be sufficiently large so that you have enough data to display when you return to the classroom. You should also talk with them about sample collection. Samples from places where environmental conditions are distinctly different are needed.



2. Divide the class into teams and give each team a set of the "Vegetation Study Field Sheets". Give each team its equipment.
  3. When you return to the classroom, have the teams transfer their data for abundance and the two variable plant characters to class histograms. (For abundance, the y-axis will have five entries: D, A, F, O, R). You may not want to use all the data collected because you will need 18 histograms. It may be more interesting to examine the abundance data for all the species and the variable plant character data for the two species.
  4. Help students think about the data they have collected through discussion and by asking these kinds of questions:
    - What might have caused some of the differences we observed?
    - Use one of the variable character histograms, and ask students what this variation is called when it occurs within the same plant? (If necessary, explain variation within a species.)
    - What evidence did you find of animal-plant interaction?
- How serious is the damage that animals do to plants? Is there a way to find out? What evidence could you collect showing that plants with damaged leaves are different than plants with undamaged leaves?
  - Did you notice any other kind of damage to leaves? What do you think caused it?
  - Discuss some of the reasons students think influence good and poor growth. Ask, what do you mean by "good" growth? By "poor" growth? How do you recognize it in the field? How could you measure it?
  - Do you think if you raised plants of the same species under similar conditions they would be alike?
  - What things does a roadside grassland community have in common with: a lawn, cornfield, hayfield? In what ways do these communities differ?
  - What was the most interesting thing that you learned in the field study?
  - What are some reasons that one plant appears in one habitat and not in another? (Habitat is the place where a plant or animal lives. It is the organism's home address.)
  - In what ways do you think humans may have affected physical features of the study site? Biological features of the study site?

VEGETATION STUDY FIELD SHEET

Put a leaf of this plant in your collecting envelope/bag

	<p>1. What are the notable features of this plant</p>
<p>2. How abundant is this plant?</p> <p>Dominant (D) _____ Abundant (A) _____ Frequent (F) _____ Occasional (O) _____ Rare (R) _____</p>	<p>3. Find and measure at least two variable characters of this plant.</p>
<p>4. What example can you find of animals using this plant?</p>	<p>5. Find a place where this plant grows well and one where it does not grow well. What do you think are the reasons?</p>

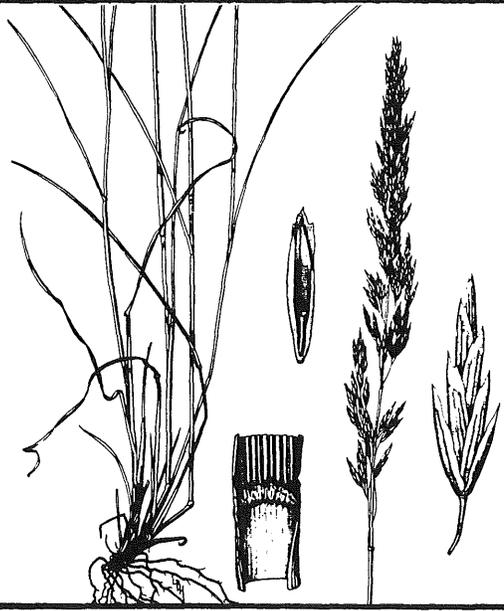


Duplicate this sheet for each team. Cut apart, and paste one drawing in the first block of each data sheet.

Brome (Dominant)



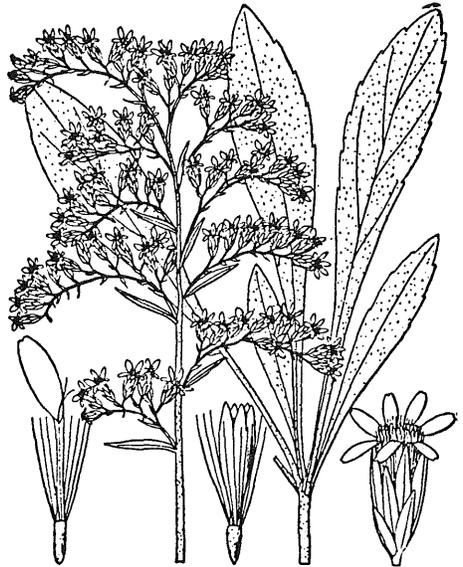
Bluegrass (Abundant)



Quackgrass (Frequent)



Goldenrod (Occasional)



Common Milkweed (Rare)



Wild Rose (Rare)





# CROSS SECTIONING A ROADSIDE



**OVERVIEW** Students investigate a roadside and learn how to make a cross section. In the process they learn about the composition of a stand of vegetation and the shape of the land.

# CROSS SECTIONING A ROADSIDE

## ROADSIDES FOR WILDLIFE

### ACTIVITY 7

**OVERVIEW** Students investigate a roadside and learn how to make a cross section. In the process they learn about the composition of a stand of vegetation and the shape of the land.

#### OBJECTIVES

After completing this activity, students will be able to:

- use a transect to collect information about the occurrence of plants;
- use a transect to make a cross section of the land;
- explain the use of sampling techniques in plant community study, i.e., how to learn more about quantities and distributions of plants where there are too many of them to count.

#### MATERIALS

For Each Team:

Rods (Stakes/Dowels/Broomsticks/Lath)  
Hammer/Rock/Board  
Line Levels  
Thermometers  
String/Monofilament Fishing Line  
Collecting Bags, Plastic or Paper Envelopes  
For Leaf Samples  
Notebooks, Pencils  
Clipboards  
Student Data Sheet: Cross Sectioning a Roadside  
Student Data Sheet: Transect Sense

#### PREPARATION

- Select and become familiar with a roadside that has a good profile. You may want to choose a roadside where the class can compare a shallow roadside situation with a steep roadside situation.

- To expedite the field work "flag" the boundaries of team study sites. Secure permission of the landowner to tie pieces of tape or cloth to the fenceline, and explain what the class will be doing.

- Subdivide the area depending on class and team size as well as availability of equipment. There is enough work at each transect for teams of 3-4 students. There should be enough space between each transect so that students do not interfere with one another or trample the vegetation they are studying. Reasonable intervals between teams are from 2-5 meters.

- The student data sheet, "Cross Sectioning a Roadside", suggests a 30 cm interval between measurements. Vary this distance depending on where you do your study.

- Students will probably not know all plant names. For those plants students do not recognize, they are asked to collect a leaf. If you have enough keys/identification guides and want to take the time, you can have students identify them. If you are not interested in having students identify the plants ask them to divide the vegetation into grasses or grasslike and broadleaf plants. However, you may want to include categories such as fungi (mushrooms), lichens, mosses, shrubs/bushes, vines, etc.

- If you work in a steep or wide roadside each team will need additional rods. It is also likely that the line will have to be dropped as the ground level becomes lower. This distance must be added to every following measurement of the distance between the line and the ground as shown in the diagram.

☐ Magazines, newspapers, and sections of catalogs/telephone directories also make useful collection bags. Use clothespins or rubber bands to keep the pages together.



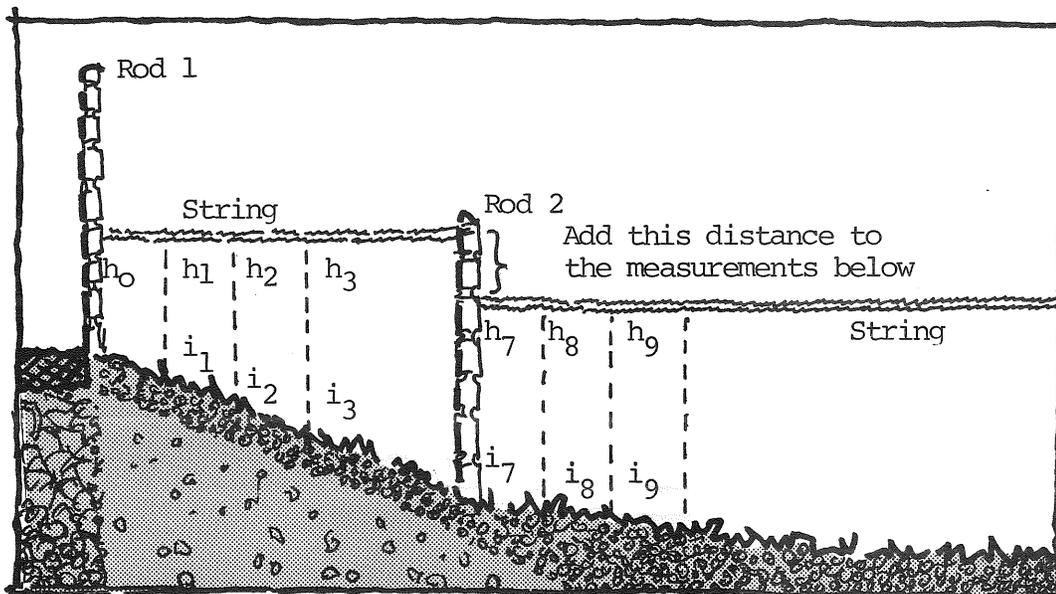
## ACTIVITY DESCRIPTION

1. Begin this activity by asking students for examples of the uneven way in which plants/plant communities are distributed across the landscape. List these on the board. Then, take five or ten minutes to discuss their responses:

- What are some factors which might influence the distribution of plants? Which of these are abiotic factors? Biotic factors?
- What are some ways plants can influence the distribution of other plants?
- What are some ways in which habitats—the place where plants live—are different from each other?
- Can you describe a sequence of plants from \_\_\_\_\_ to \_\_\_\_\_ (e.g., from a forest to a lake or from a field to a pond)?
- In what ways do humans influence plant distribution?
- In what ways do other animals influence plant distribution?
- If some students have been to the mountains, ask: what are some relationships between altitude and plants/plant communities?

2. Next, tell students that they are going to investigate one of these factors: The influence of topographic features of a roadside on the distribution of plants.

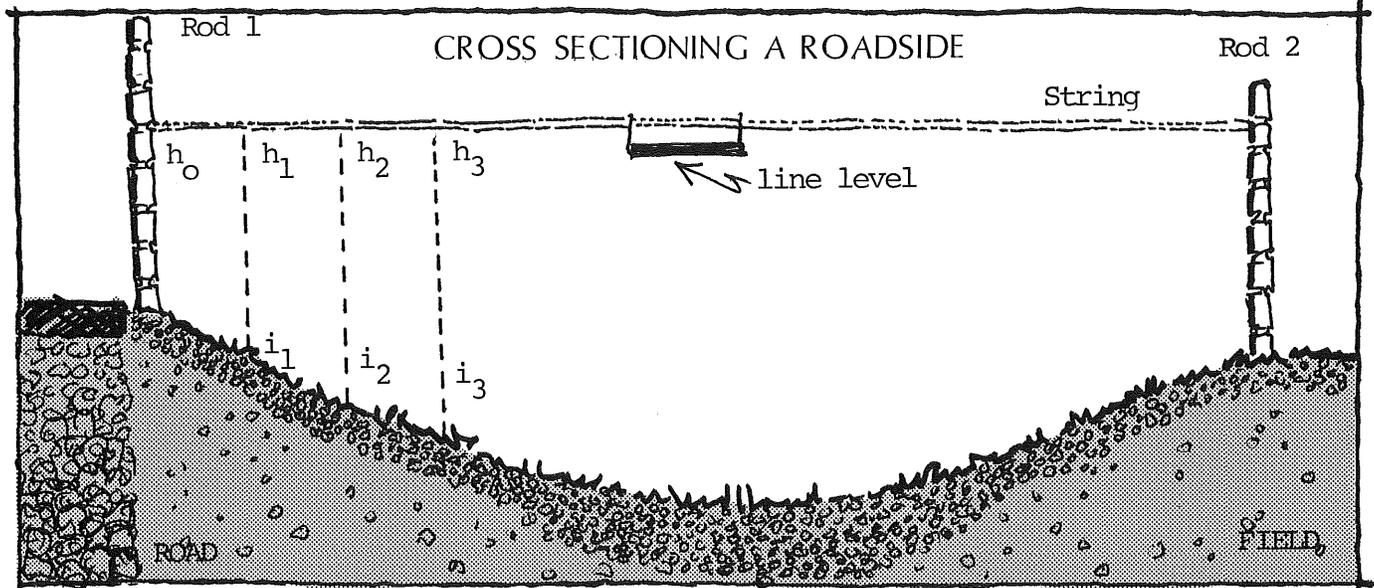
3. Divide your class into small teams. Give each team a copy of "Cross Sectioning a Roadside" and review the field assignment. When you are at the study site, point out its boundaries, assign teams to their stations, and give them their field materials. Circulate among the teams as they work, encouraging them to take accurate measurements and to record their data carefully.



4. When you return to the classroom, give students a copy of "Transect Sense". Students can make their graphs on unlined or graph paper. If they use unlined paper, they may learn more about how to scale axes, including some of the pitfalls. This suggestion is made in the belief that understanding graphing is as important as the finished project.
  5. Summarize the lesson by discussing the questions from "Transect Sense" and by asking these kinds of questions:
    - Does topography appear to influence the composition of roadside plant communities? What is the evidence? How good is it?
    - What would you say about the way plants are distributed in the roadside community we studied? Do they seem to grade together or are there distinct zones? What is your explanation?
- What are some environmental factors which may influence the composition of this community?
  - Of the environmental factors listed, which do you think are more important in their influence on the community, physical or biological? What experiments are suggested?
  - What do we really mean when we use terms such as sunny or shady and moist or wet? What are some ways the environmental variables could be measured?
  - How is field work similar to a laboratory experiment? Different from a laboratory experiment?
  - What are some things you learned from this work?

CROSS SECTIONING A ROADSIDE  
STUDENT DATA SHEET

Team Members: \_\_\_\_\_



1. Arrange rods (in a line) and string as shown. Check the level of the string by hanging a line level centrally between the two rods.
2. Beginning at rod 1, measure the distance from the rope to the ground ( $h_0$ ) and continue at 30 cm (~1') intervals ( $i_1, i_2, i_3$ , and so one) until you have measured all the heights ( $h_1, h_2, h_3$ , and so on).
3. In a field notebook or on another sheet of paper record the following information at each station:

DATA TABLE

Interval Length: \_\_\_\_\_

Station	Height	Plant Name	Plant Height	Environmental Factors
Rod 1	$h_0$	(Write the name of the plant or collect a leaf specimen of the plant that occurs there, unless your teacher indicates otherwise. Be <u>sure</u> you label the leaf so that you know the location of the plant.)		(Your judgements about the environmental factors require "barefoot ecology". Most of information is obtained through your senses:  Soil Moisture: dry, moist, wet Soil Color: light, dark Soil Texture: feels gritty, not gritty Soil Compaction: can push finger into soil, can push finger with difficulty cannot push into soil Light Intensity: very sunny, moderately sunny, shady Temperature: ground level, plant
$h_1 - i_1$				
$h_2 - i_2$				
$h_3 - i_3$				
$h_n - i_n$				



TRANSECT SENSE

Use the measurements to make a graph of the ground cross section

- Draw a line to represent the string
- Choose a vertical scale, \_\_\_\_\_ cm = \_\_\_\_\_.
- Choose a horizontal scale, \_\_\_\_\_ cm = \_\_\_\_\_.
- Indicate the scales you have chosen.
- Use data points (•) to indicate the ground. When you have plotted all the points join them together with a line.
- Make a key to represent each of the plants.
- For each station draw the plant to scale, using the symbol you have chosen to represent it.
- Label the horizontal scale and the vertical scale.
- Give the graph a title.

QUESTIONS

- Are there changes in vegetation, that is, do plants appear to be distributed in distinct patterns? What is your evidence?
- Does there appear to be a relationship between plants heights and their position in the transect? What might explain this relationship?
- Do there appear to be any relationships between the positions of living things and environmental factors? What are they?
- In which part of the transect is human influence most evident? Least evident? What are your reasons?



# THE (OB) NOXIOUS NINE

ROADSIDES FOR WILDLIFE  
ACTIVITY 8



**OVERVIEW** In this lesson students become familiar with some of the adaptations of weeds and discover how the environment of roadsides effects the growth of weeds. The question they explore in their field work is what makes weeds do so well. During the final part of the lesson, students participate in a value change activity. They consider a typical attitude toward roadside plants, namely that all plants in roadsides are weeds or, that, if managed for wildlife would become a refuge for weeds. What is this value? Where did it come from? What is its purpose? Can it be changed? How?

# THE (OB) NOXIOUS NINE

# ROADSIDES FOR WILDLIFE ACTIVITY 8

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## OBJECTIVES

After completing this activity, students will be able to:

- discuss adaptations of weeds;
- describe environmental factors that affect the growth of weeds;
- list reasons why weeds appear and spread successfully;
- define noxious weeds;
- describe why it is difficult to get rid of weeds.

## PREPARATION

- Many roadsides are relatively weed free. Before you take your class into the field, select and become familiar with a roadside that has one or, preferably, more noxious plants for each team to observe and study.

If you cannot find a site with any or enough of the nine noxious weeds, use some of the secondary weeds of common lawn/playground, e.g., dandelion, purslane, ground ivy ("Creeping Charlie"), plantain, etc. Make up some of your own plant identification cards.

However, the lesson will be much more effective if you persist until you locate noxious weeds.

## MATERIALS

### FOR THE TEAMS:

Trowel/Shovel  
Gloves/Socks (for handling spiny plants)  
Clipboard  
Student Data Sheet-Common Ruderals  
Student Data Sheet-Weed Study Challenge Cards  
Student Data Sheet-Give Them A Centimeter  
and They'll Take A Kilometer  
Student Data Sheets-Minnesota Noxious Weeds

### FOR THE CLASS:

Flagging material

### FOR THE TEACHER:

Teacher Sheet: Noxious and Secondary Weeds-An Information Sheet  
Teacher Sheet: Crops, Weeds, and Roadsides-An Information Sheet  
Teacher Sheet: Minnesota Noxious Weed Law-An Information Sheet

- Secure permission of the landowner to tie pieces of tape or cloth to the fenceline and also explain what you are doing. To expedite the time the class has for field work, "flag" boundaries and team study sites in advance. The size of the study area and the way in which it is subdivided into study sites will depend on class and team size, distribution of weed species, and availability of equipment.

- Poison Ivy (Rhus radicans) is one of the noxious nine, but should be studied with eyes only, even in this activity. Before you go into the field review the characteristics of this plant with your class, and warn students not to handle it. If you have an opportunity to point out poison ivy in the field take full advantage of it. Many people cannot identify it even after it has been shown to them several times. Remind students that if they ever work with poison ivy that should ALWAYS wear gloves, even if they think they are not allergic to it.

# ACTIVITY DESCRIPTION

1. Introduce this lesson by asking students to collect and bring to class, three to four of the most common weeds they can find in lawns, flower gardens, pastures, vegetable gardens, along footpaths, or roadsides. Ask them to be especially careful to include the root structure. Divide the class into small groups and give each of them a copy of "Common Ruderals". Give them about 15 to 20 minutes to complete the work.
2. Put the following chart on the board and ask each group to discuss their decisions.

	Characteristics	Adaptations
Group #___		

After the chart has been completed use these kinds of questions to stimulate discussion:

- How many adaptations did you notice? What possible advantage to a plant are the following: large pollen production, wide-open flowers, large quantity of seeds produced, can grow from fragments of plant parts, rapid growth, inconspicuous flowers, short life cycle, can germinate in many environments? Can you give some examples?
- What are some characteristics of an ideal weed?
- What one word best describes a weed?
- How do the following two definitions of a weed differ from one another?
  - 1) A plant out of place.
  - 2) A plant that has evolved to occupy the weed habitat. (The first definition reflects considerable human bias. The second is a less biased, more objective definition. Weed habitat infers ideas such as: a specific geographic area, human disturbance, and that many plants referred to as weeds are not weeds.)
- Which one of the two definitions above is the best definition? Why do you say that?

3. Before you go into the field, divide the class into teams of three or four, and give each team a copy of "Minnesota Noxious Weeds". Your students may not be familiar with the concept of noxious weeds. Tell them that only nine weeds are classed as noxious. Noxious weeds are problem weeds. Noxiousness implies difficulty of extermination, health hazards, and competition with agricultural plants for space, water, light, and minerals (enough to reduce crop yields and cost the farmer money).

There is a secondary list of 47 weeds that can be placed on a county noxious weed list. (For additional information see "Minnesota Noxious Weed Law — An Information Sheet" and "Noxious and Secondary Weeds — An Information Sheet".)



4. When you are in the field, point out the flags that mark the boundaries of the class study site and team sites.
5. Give each team a set of "Weed Study" cards, and tell them to find as many of the challenges as they can. Each team should have a pair of gloves (or old socks). Circulate among teams as they work. Encourage them to make observations, and to record their data carefully.

6. When you return to the classroom, have students report on their findings. Weed-out ideas by asking these kinds of questions:

- What are some common conditions among the areas where weeds grow best?
- Do areas of maximum disturbance show the most weeds, either numbers, or kinds, or both? What is the evidence?
- What relationship, if any, is there between weeds and humans?
- Are weeds growing under different environmental conditions alike, or are they different? What evidence is there that differences in environmental conditions have some influences on the plants?
- Based on what you have discovered, what are some reasons that weeds can be so difficult to control?

7. In this part of the lesson, students examine weeds from a values perspective rather than a biology perspective. The reasons for doing this, as well as some background information, are found in "Crops, Weeds, and Roadsides—An Information Sheet".

Divide your class into small groups and give each group a copy of "Give Them A Centimeter and They'll Take A Kilometer". Students should work toward a consensus opinion for each question. All group members should be involved in the preparation of the group report. Rather than assign a secretary or a reporter, each student in a group should take a turn writing the report and each student should be prepared to discuss their group's decisions.

8. The group decisions should provide a rich basis for discussion. Encourage students to explain their reasoning. Use these kinds of questions to stimulate discussion:

- Does this part of the lesson raise additional issues we could discuss? Which?
- How do you think you could become better informed about issues related to weeds?
- Did all of the groups agree? Why or why not?

## EXTENSIONS

1. Interested students can design and carry out related investigations. Some suggestions are:

- Design both a field and a laboratory investigation to find out whether some plants make conditions unfavorable for other plants.
- Design an experiment to find out whether fragments of a weed plant can grow into an adult plant: What size fragment? Under all conditions? Certain conditions?
- Design an experiment to measure the anchoring power of plants, especially noxious weeds. Describe quantitative and non quantitative methods. What are advantages and disadvantages to each?

2. Interested students can study further the relationship of weeds to agricultural crops:

- Both occupy disturbed habitats. What are some of the similarities and differences between them?
- One general characteristic of weeds is that they germinate in many environments. Is this true of agricultural crops? How could you find out which is a better germinator, a weed species or a crop species?

ROADSIDES FOR WILDLIFE  
A Supplementary Curriculum

Produced By

The Minnesota Environmental Science Foundation, Incorporated  
for the

Pioneerland Regional Environmental Education Council

and the

Minnesota Department of Natural Resources, Roadsides For Wildlife Program

COMMON \*RUDERALS

Sort and arrange your collections of weeds on the basis of similarities and differences. Record your observations and ideas on the following chart. Adaptations are features of plants (and animals) that help them grow and survive. Suggest reasons why the weed plants you are examining are so successful.

PLANT NUMBER	PLANT CHARACTERISTICS	PLANT ADAPTATIONS

\*RUDERAL: A disturbed habitat, specifically one in which the original community is destroyed and the destructive agent is repeatedly applied. "Ruderals"— hardy plants, often introduced from elsewhere, which grow where the original vegetation has been disturbed by humans.



WEED STUDY

Use the back of this sheet to make an outline map of your weed activity site. The locations of the challenges described on the Weed Study Cards.

<p>WEED STUDY — CHALLENGE CARD</p> <p>Where do weeds grow best? Use a "B" to mark their positions on the map.</p> <p>What do you mean by grow "best"?</p> <p>Why do you think they grow well here?</p>	<p>WEED STUDY — CHALLENGE CARD</p> <p>Where are the areas disturbed by humans on your study site? Mark the positions on your map with a "DA". (If these are quite large outline them with a dotted line.)</p> <p>What evidence is there that weeds are encouraged or inhibited by the disturbance?</p>
<p>WEED STUDY — CHALLENGE CARD</p> <p>Where do weeds not grow well? Use a "NW" to note their positions on the map.</p> <p>What do you mean by do not grow well?</p> <p>What do you think is the reason?</p>	<p>WEED STUDY — CHALLENGE CARD</p> <p>Make a detailed list of the characteristics of one of the weeds. On your map, mark the location with two letters from the common name of the plant.</p> <p>What kind of root does your weed have? (Carefully dig or pull up a plant unless your teacher indicates otherwise.)</p>
<p>WEED STUDY — CHALLENGE CARD</p> <p>Find the same weed growing in two different situations. Use S1 and S2 to note their positions on the map.</p> <p>How do the environmental factors differ?</p> <p>What effect, if any, do the environmental factors have on the weed?</p>	<p>WEED STUDY — CHALLENGE CARD</p> <p>What evidence can you find that weeds have natural enemies? On your map, mark these places with an "E".</p> <p>List all the natural enemies you find evidence for, and state your evidence.</p>



GIVE THEM A CENTIMETER AND THEY'LL TAKE A KILOMETER

Grassy roadsides provide a significant portion of the permanent grassland cover in many regions of Minnesota's farm country. If left undisturbed, roadsides in southern and western Minnesota could provide more than a half million acres of critically needed habitat for nesting wildlife. The DNR estimates that one-quarter to one-half of successful pheasant nests and the majority of gray partridge nests are built in undisturbed roadsides. If properly seeded and managed, roadsides need not require widespread mowing or spraying to keep them free of noxious weeds. This is especially true of roadsides dominated by a stand of diverse native grasses and broadleaf forbes. Properly cared for, these roadside plants simply outcompete the unwanted weeds, especially noxious species that are of concern to agriculture. However, we are faced with a problem: Many people regard almost all plants in roadsides as weeds or think that if roadsides are managed for wildlife, they will be a source and refuge for harmful weeds.

How did this value become part of our culture?

What does this value do for us?

Can this value be changed? If you think it cannot, why not?

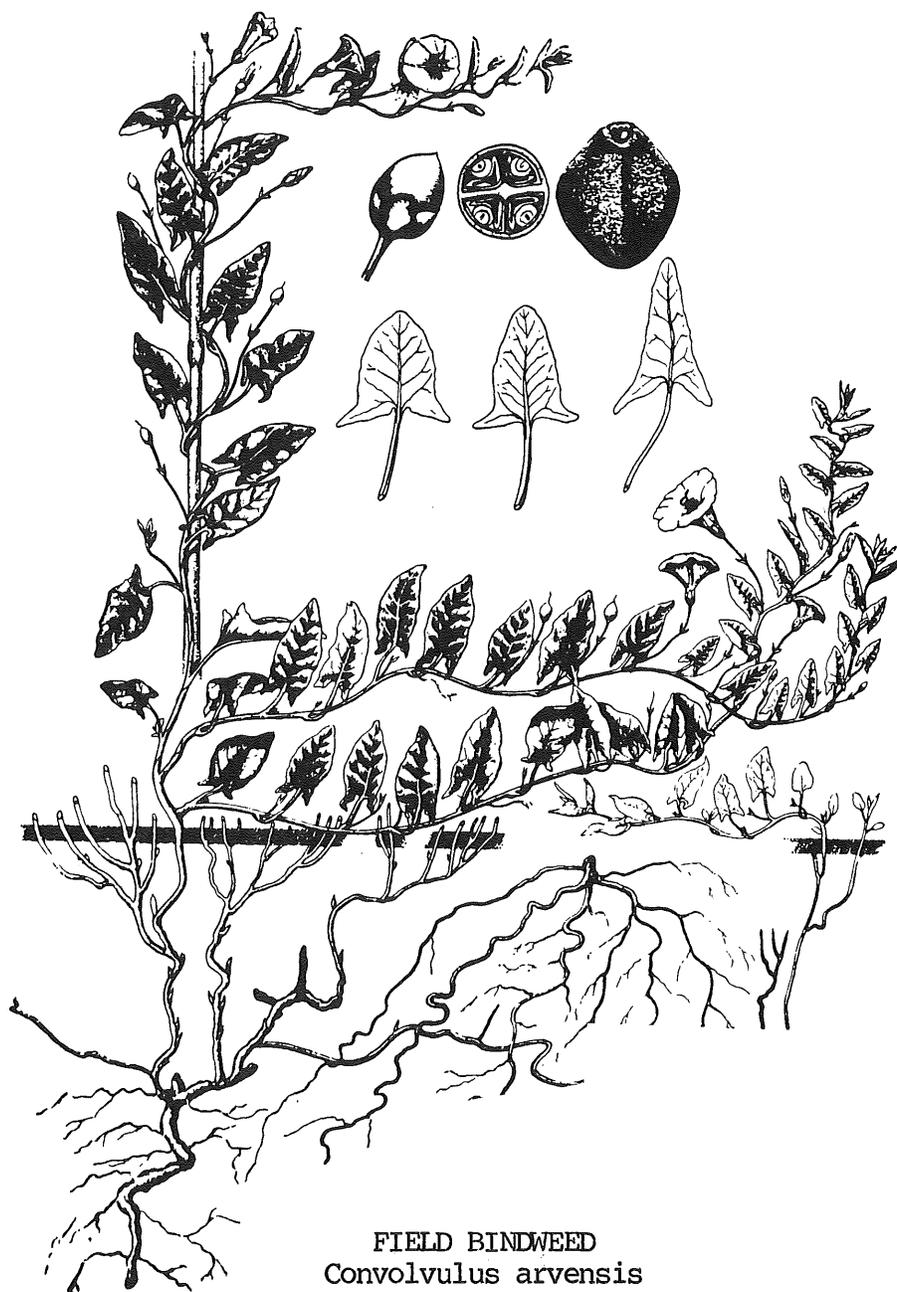
If you think it can, what value should replace it?

How can this value be changed?

What would be the effects if the majority of people changed their minds on this value?



MINNESOTA NOXIOUS WEEDS, p.1



FIELD BINDWEED  
*Convolvulus arvensis*

Field bindweed is an introduced perennial, reproducing by seeds and rootstocks. The root system can be quite extensive with roots going down 20 to 30 feet. A two to three year food reserve can be stored in root system. Seeds are dark brownish-gray, roughened, about 1/8 inch long with one rounded and two flattened sides. The stems are smooth, slender 2 to 7 feet long, and twining or spreading over the surface of the ground. The leaves are ovate with spreading basal lobes. The flowers are white or pink, trumpet shaped, 1 inch across and usually borne singly in the leaf axils. The flower stalk has two bracts about 1/2 to 2 inches below the flower. Seeds are borne in an egg-shaped pod containing four seeds. It is found in and able to persist and spread in all non-cultivated areas and under most cropping systems.

Minnesota Department of Transportation. Maintenance Manual, August 18, 1980.



MINNESOTA NOXIOUS WEEDS, p.2



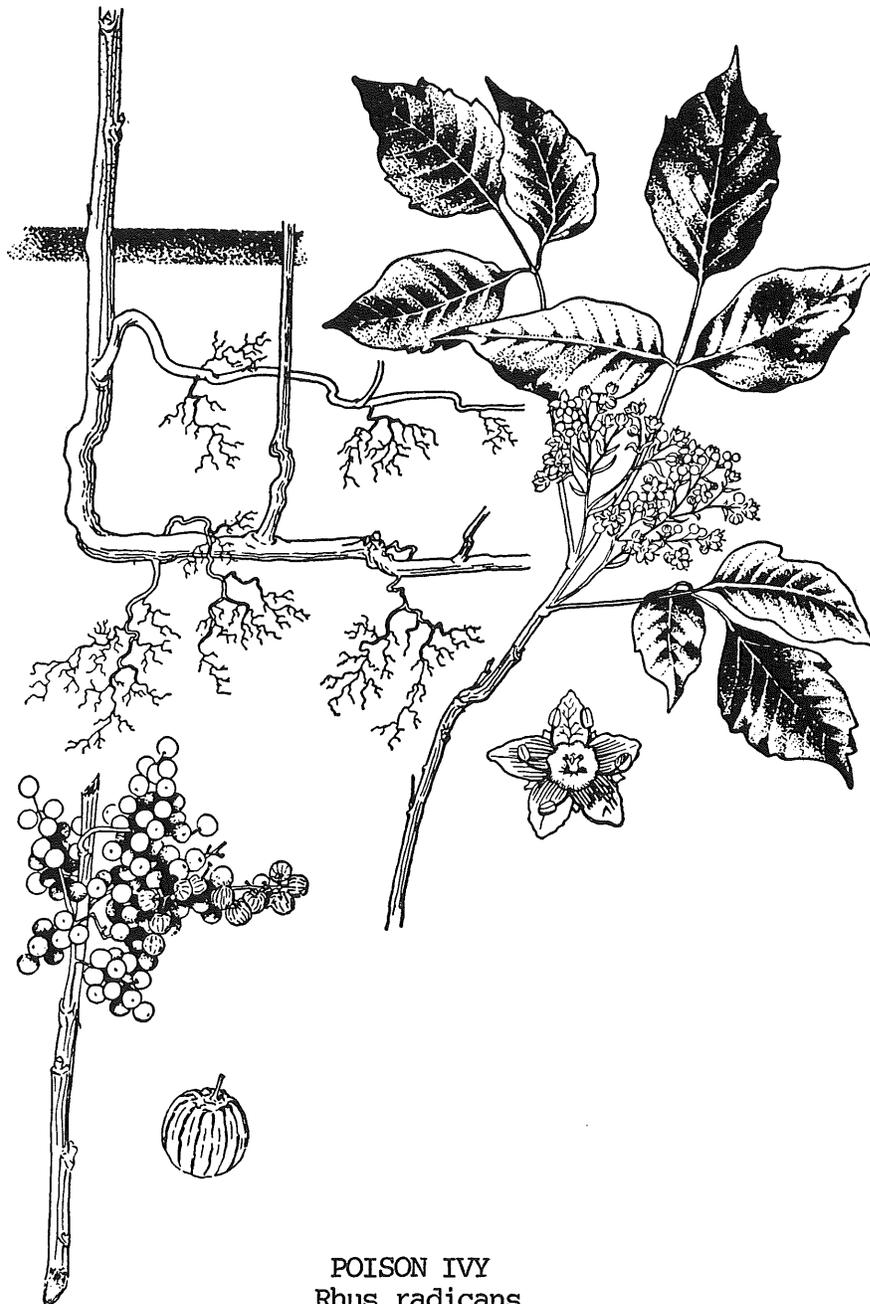
HEMP (Marijuana)  
*Cannabis sativa*

Hemp is an introduced annual, reproducing by seed. It is found in waste places, pastures, barnyards, drainage ditches, roadsides, and occasionally cropland. The seeds are oval, mottled brown, about 1/8 inch long. Hemp grows from 3 to 14 feet high with rough hairy stems. The leaves are palmately compound with 5 to 9 hairy leaflets that have notched or uniformly jagged edges. Plants are usually bushy unless crowded. Hairs on the upper part of the plant exude a characteristic odor. The flowers consist of 2 kinds: male and female flowers on separate plants. Neither flower has any petals. Both flowers are borne from the axils of the upper leaves. The male plants turn yellow and die after shedding pollen while female plants remain green until frost.

Minnesota Department of Transportation. Maintenance Manual, August 18, 1980.



MINNESOTA NOXIOUS WEEDS, p.3



POISON IVY  
*Rhus radicans*

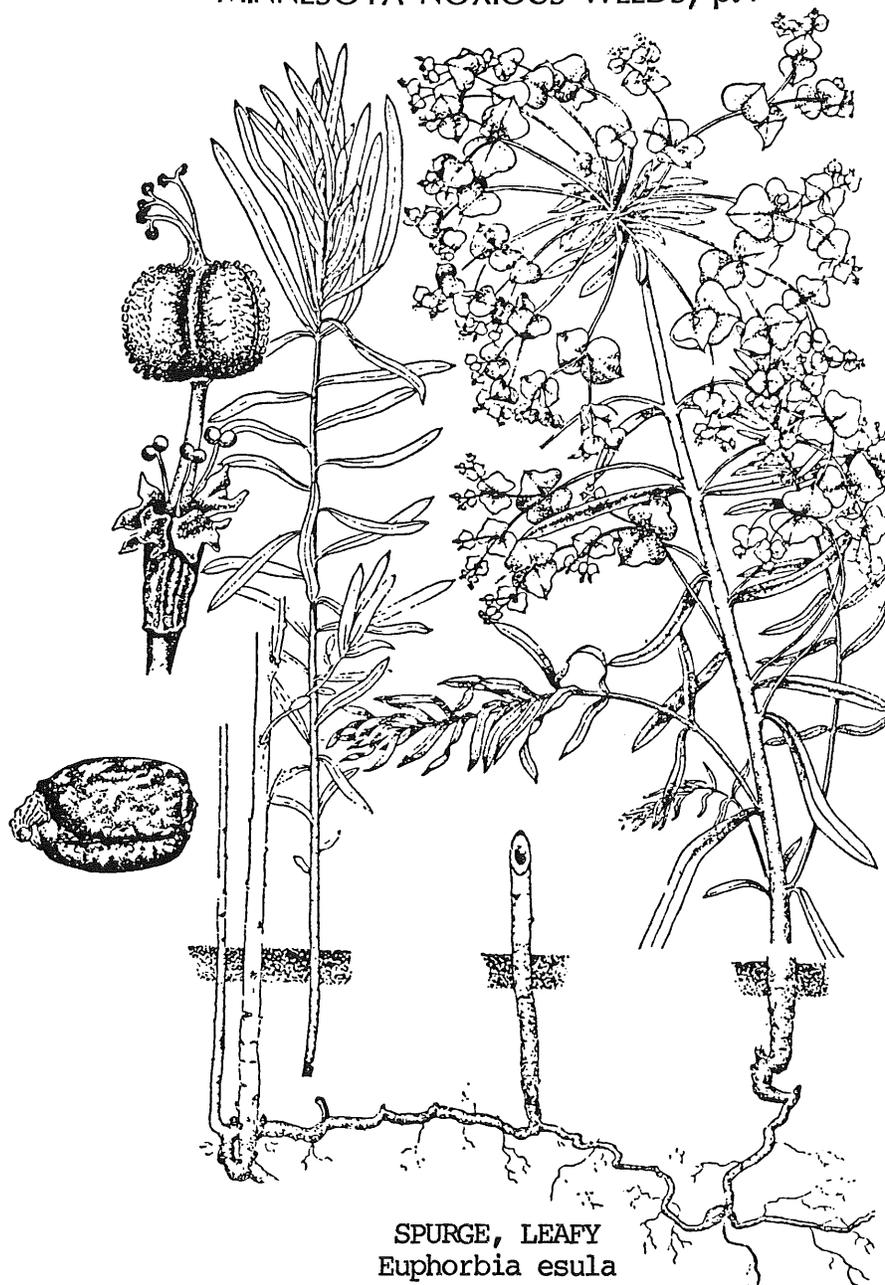
Poison ivy is a native woody perennial, reproducing by seed and underground rootstocks. It is found growing in woodlands and meadows and along streams or low places, fence rows, roadsides and wastelands. All parts of this plant contain a poisonous material.

The stems are from 8 to 18 inches high. The leaves are smooth, shiny or waxlike in appearance and divided into 3 parts (leaflets). Each leaflet is from 1 to 4 inches long. The flowers are small, green, 5 petaled and arranged in clusters. The plant changes from bright green in summer time to reddish-yellow in late summer and fall.

Minnesota Department of Transportation. Maintenance Manual, August 18, 1980.



MINNESOTA NOXIOUS WEEDS, p.4



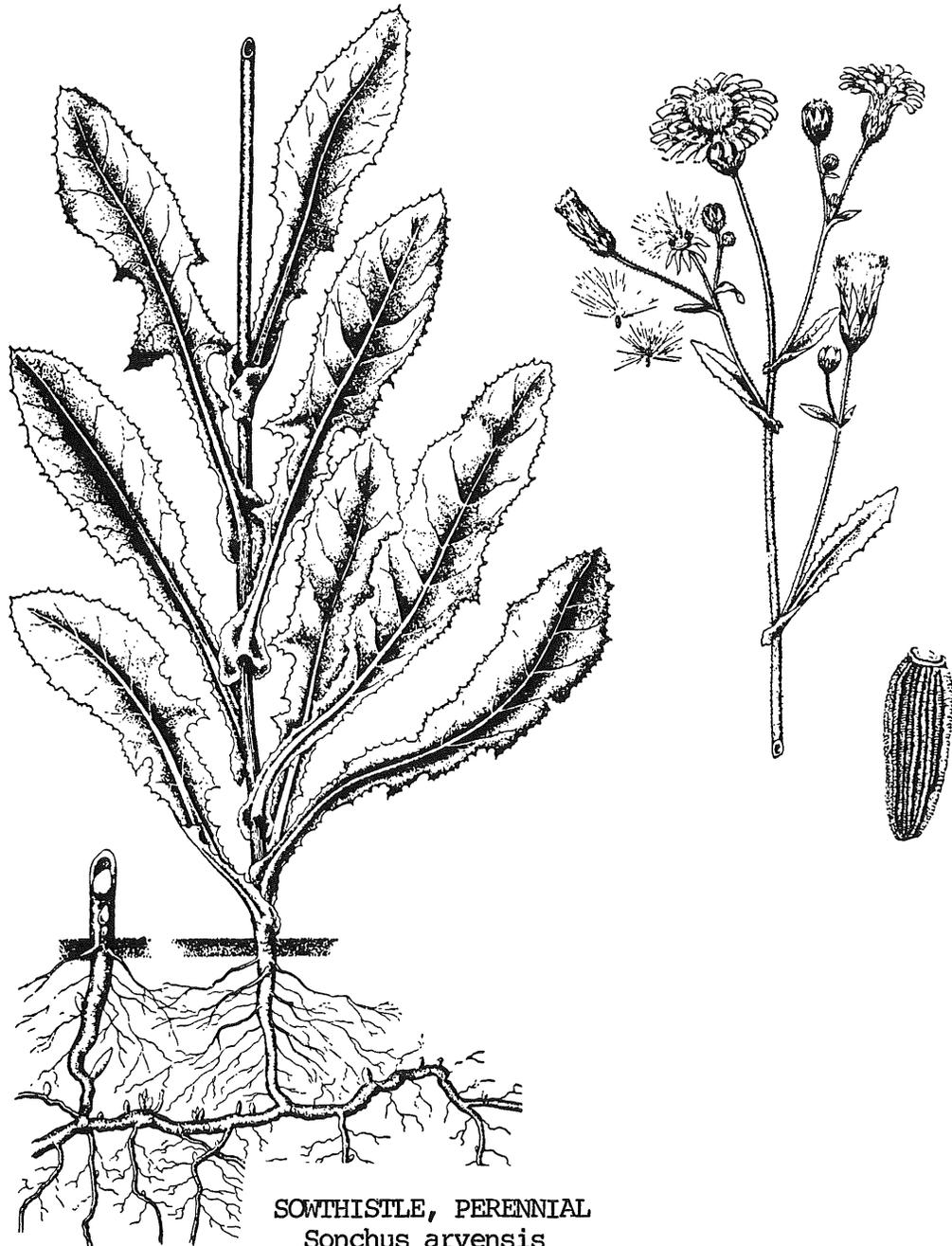
SPURGE, LEAFY  
*Euphorbia esula*

Leafy spurge is an introduced perennial, reproducing by rootstocks and seeds. The root system may penetrate into the soil to a depth of 15 feet or more. The reddish-brown roots have numerous buds which can produce a new plant when tops are destroyed. The root system can store 2 to 3 years supply of food to carry the plant through adverse conditions. The stems are erect, smooth, branched toward the top, 1 to 2 feet tall and contain a milky juice. The leaves are arranged alternately on stems and are strap-shaped, 1/4 inch wide and usually drooping. The flowers are small, pale greenish-yellow and have 2 heart-shaped floral bracts. The seeds are smooth, light gray, resemble a small beetle somewhat, and are contained in a 3-lobed pod. It is found in pastures, waste areas, roadsides, and in cultivated fields. It is a very persistent weed.

Minnesota Department of Transportation. Maintenance Manual, August 18, 1980.



MINNESOTA NOXIOUS WEEDS, p.5



SOWTHISTLE, PERENNIAL  
*Sonchus arvensis*

Perennial sowthistle is an introduced perennial, reproducing by airborne seeds and creeping rootstocks. Roots may penetrate soil to a depth of several feet and spread horizontally, producing sap. The leaves are 4 to 8 inches long, alternate, irregularly toothed, lobed and have spiny edges. The flower heads are about 1-1/2 inches across with a deep yellow ray type of flower. (The annual sowthistle's flower is about 3/4 inch across, light yellow in color.) The seed is dark reddish-brown, about 1/8 inch long, slightly flattened, 5 to 7-ribbed with smaller cross wrinkles. It is found in cultivated fields, pastures, wastelands, and roadsides. It is a persistent weed that can be spread rapidly.

Minnesota Department of Transportation. Maintenance Manual, August 18, 1980.



MINNESOTA NOXIOUS WEEDS, p.6



THISTLE, BULL  
*Cirsium Vulgare*

Bull Thistle is a biennial, reproducing by seed. It is found in pastures, meadows, waste places, fence rows, and roadsides.

Bull thistle grows 3 to 6 feet high. The first year it produces a large tap root and a rosette of flat leaves. The second year it produces an upright stalk, blooms, produces seed and then dies. The stems are stout and spiny, with the margins extending down the stems. The leaves are spiny, alternate, 3 to 6 inches long, dark green on the upper surface and pale green on the lower surface, and have irregular, spiny margins. The flowers are a deep purple or rose color and measure about 1 1/2 to 3 inches across. The buds or bolls also are covered with a number of stiff, sharp yellow spines. The seeds are straw-colored, striped lengthwise with brown, and tipped with a parachute of soft branched bristles.



MINNESOTA NOXIOUS WEEDS, p.7



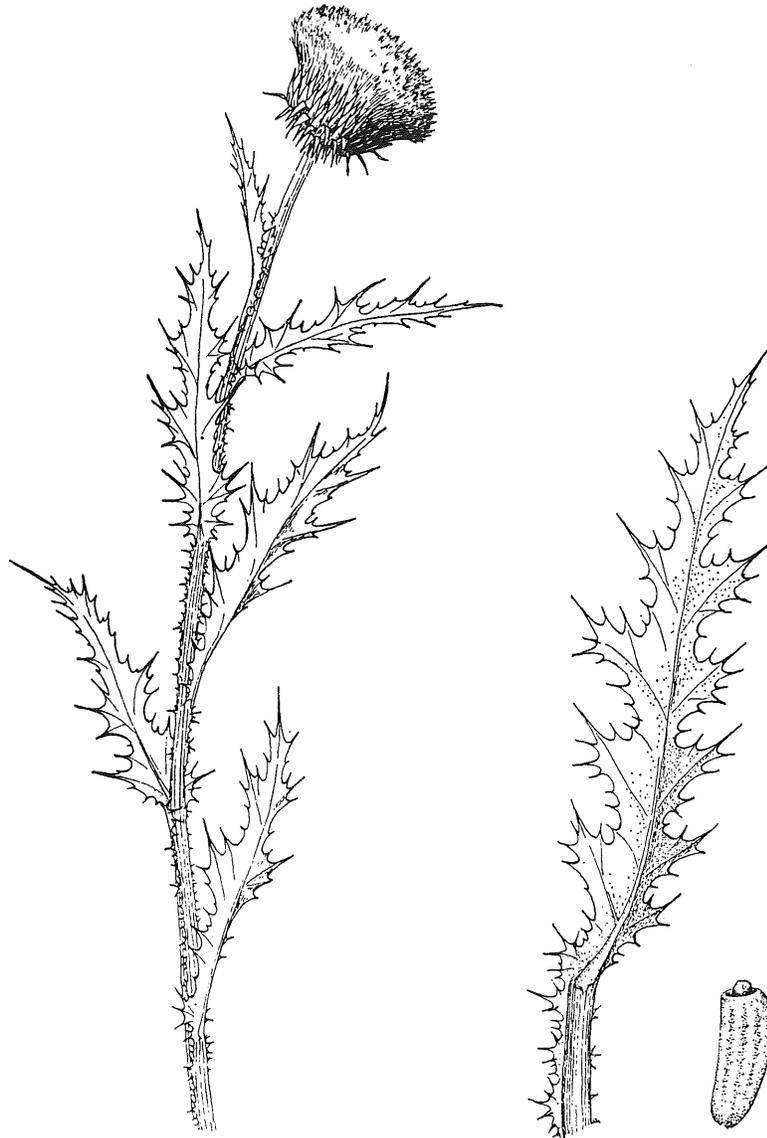
THISTLE, CANADA  
*Cirsium arvense*

Canada thistle is an introduced perennial, reproducing by airborne seeds and creeping roots which can be extended several feet deep and some some distance horizontally. The seeds are easily scattered by wind and are capable of long dormancy periods. Each piece or segment of the root system is capable of giving rise to a new plant. The flower heads are numerous, compact, about 3/4 inch or less in diameter and lavender or pink in color. The flower is surrounded by bracts with spiny tips. Male and female flowers are usually on separate heads and borne on different plants. The leaves usually have crinkled edges, spiny margins, and are somewhat lobed and smooth. While this description fits most Canada thistles, there are a number of varieties differing slightly in appearance and relative maturity. Canada thistle can be found in cropland, roadsides, fence rows, pastures, woodlands, and waste areas. It is a troublesome and persistent weed making it often very difficult to control.

Minnesota Department of Transportation. Maintenance Manual, August 18, 1986.



MINNESOTA NOXIOUS WEEDS, p.8



THISTLE, MUSK  
*Carduus nutans*

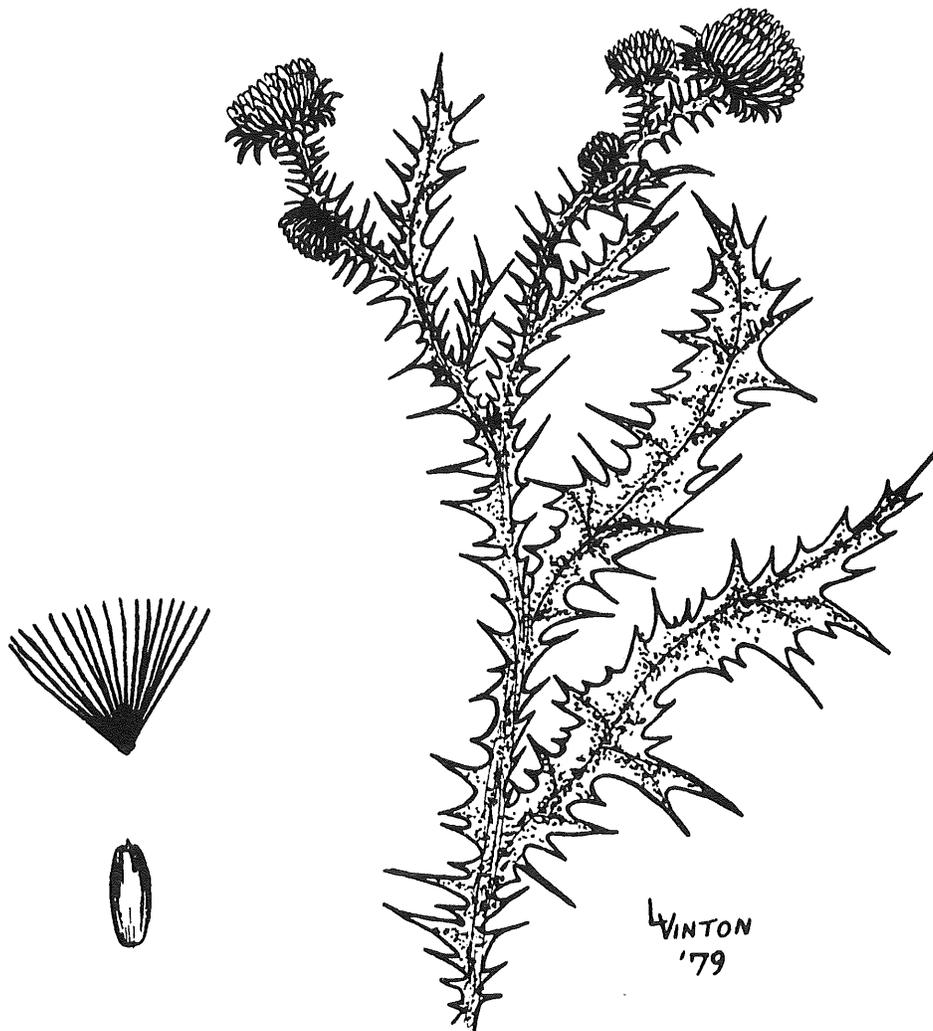
Musk thistle is an introduced biennial reproducing only by seed. It is found in pastures, meadows, along roadsides and in woodlots. It produces only a rosette of leaves the first year. The flowering stalk is produced the second year.

It grows 2 to 4 feet high and has large spiny dark green leaves that have the leaf margins extending down the stem. The heads are solitary on a stem or branch. The large 2 to 3 inch across heads are nodding on rather slender stalks. This thistle, as well as the plumeless thistle, is distinguished by the unbranched plumes attached to the flowers and seeds. The plant has a strong unpleasant odor from which it gets its name.

Minnesota Department of Transportation. Maintenance Manual, August 18, 1980.



MINNESOTA NOXIOUS WEEDS, p.9



THISTLE, PLUMELESS  
*Carduus acanthoides*

Plumeless thistle is a biennial, reproducing by seed. It is found in pastures, waste places, feed lots, along roadsides and fence rows. It is an introduced weed that has been spreading rapidly in recent years.

A heavy taproot and rosette of leaves are produced the first year. The second year a rough, hairy, flowering stalk 2 to 4 feet high is produced. The leaves are very spiny, deeply cut and extend down the stems. The heads are spiny, 1 to 2 inches across and are pink to purple. The plumes attached to the seed are not branched—hence the name plumeless. This plumeless feature distinguishes this thistle from the other thistles—Canada, bull, Flodman, etc.

Minnesota Department of Transportation. Maintenance Manual, August 18, 1980.



ROADSIDES FOR WILDLIFE

THE (OB) NOXIOUS NINE  
TEACHER SHEET

NOXIOUS AND SECONDARY WEEDS - AN INFORMATION SHEET

1. Noxious Weeds. The following plants are deemed by the Minnesota Commissioner of Agriculture to be injurious to public health, public roads, crops, livestock, and other property as noxious weeds:

<u>COMMON NAME</u>	<u>BOTANICAL NAME</u>
Field Bindweed	Convolvulus arvensis
Hemp	Cannabis sativa
Poison Ivy	Rhus radicans
Spurge, Leafy	Euphorbia esula
Sowthistle, Perennial	Sonchus arvensis
Thistle, Bull	Cirsium vulgare
Thistle, Canada	Cirsium arvense
Thistle, Musk	Carduus nutans
Thistle, Plumeless	Carduus acanthoides

2. Secondary Weeds. A weed or weeds may be selected from the following list to be placed on a county noxious weed list by following the procedure outlined in (3) below.

<u>COMMON NAME</u>	<u>BOTANICAL NAME</u>
Alyssum, hoary	Berteroa incana
Artichoke, Jerusalem	Helianthus tuberosus
Buckwheat, wild	Polygonum convolvulus
Buffalobur	Solanum rostratum
Burdock	Arctium minus
Buttercup, tall	Ranunculus acris
Bracken	Pteridium aquilinum
Carrot, wild	Daucus carota
Catchfly, nightflowering	Silene noctiflora
Cockle, white	Lychnis alba
Cocklebur, common	Xanthium pensylvanicum
Daisy, oxeye	Chrysanthemum leucanthemum
Dock, curly	Rumex crispus
Flixweed	Descurainia sophia
Foxtail, giant	Setaria faberii
Gumweed	Grindelia squarrosa
Hawksbeard, narrowleaf	Crepis tectorum
Hawksbeard, smooth	Crepis capillaris
Hawkweed, orange	Hieracium aurantiacum
Jimsonweed	Datura stramonium
Kochia	Kochia scoparia
Lambsquarters, common	Chenopodium album
Mallow, Venice	Hibiscus trionum
Marshelder	Iva xanthifolia
Milkweed, common	Asclepias syriaca

ROADSIDES FOR WILDLIFE

THE (OB) NOXIOUS NINE  
TEACHER SHEET

Noxious and Secondary Weeds  
Page Two

2. Secondary Weeds List (continued)

<u>COMMON NAME</u>	<u>BOTANICAL NAME</u>
Muhly, wirestem	Muhlenbergia frondosa
Mustard, wild	Brassica Kaber
Nightshade, black	Solanum nigrum
Nutsedge, Yellow (nutgrass)	Cyperus esculentus
Oat, wild	Avena fatua
Panicum, fall	Panicum dichotomiflorum
Panicum, wild proso millet	Panicum miliaceum
Pigweed, redroot	Amaranthus retroflexus
Pigweed, prostrate	Amaranthus blitoides
Quackgrass	Agropyron repens
Radish, wild	Raphanus raphanistrum
Ragweed, common	Ambrosia artemisiifolia
Ragweed, giant	Ambrosia trifida
Sandbur, field	Cenchrus pauciflorus
Smartweed, Pennsylvania	Polygonum pennsylvanicum
Smartweed, (ladysthumb)	Polygonum persicaria
Sunflower, common (except cultivars)	Helianthus annuus
Tansy	Tanacetum vulgare
Velvetleaf	Abutilon theophrasti
Yellow rocket	Barbarea vulgaris
Woolly cupgrass	Eriochloa villosa
Wormwood, absinth	Artemisia absinthium

3. The Minnesota Commissioner of Agriculture may, without further hearing, take a weed or weeds from the secondary list (2) above and add it to the noxious weed list (1) on a county basis if:
- A majority of the Township Boards and City Mayors in a county petition the Commissioner of Agriculture, on forms provided by the Department, to add a weed or weeds to the primary noxious list on the grounds that the weed or weeds is injurious to public health, public roads, crops, livestock, or other property;
  - The petition is approved by that county's Board of County Commissioners; and,
  - The Commissioner of Agriculture deems the weed or weeds to be injurious to public health, public roads, crops, livestock, or other property.

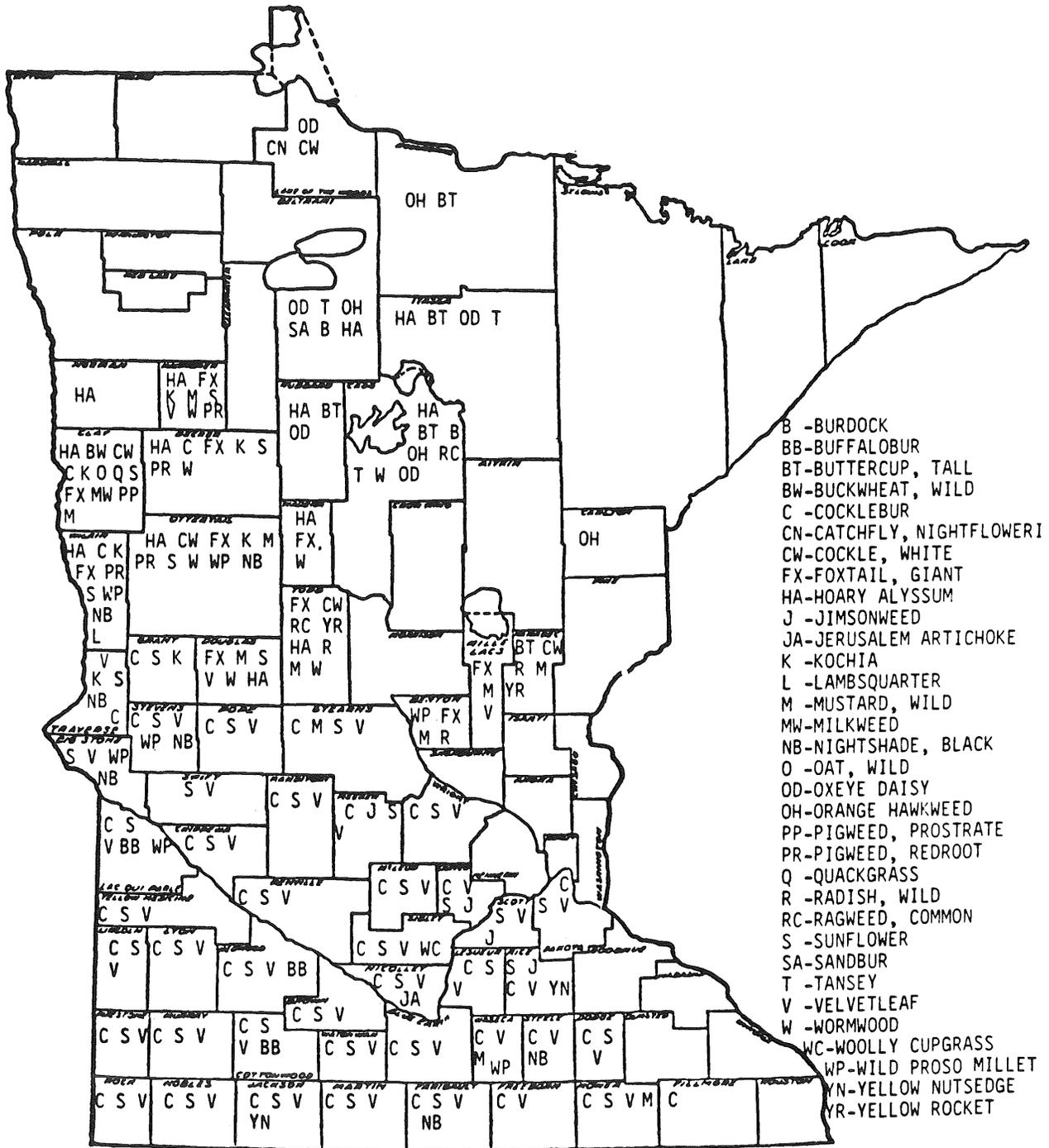
SOURCE: Legal Procedure for the Enforcement of the Minnesota Noxious Weed Law, Agronomy Services Division, Minnesota Department of Agriculture, 1984.

ROADSIDES FOR WILDLIFE

THE (OB)NOXIOUS NINE  
TEACHER SHEET

Noxious and Secondary Weeds  
Page Three

SECONDARY NOXIOUS WEEDS BY COUNTY PETITION  
June 12, 1984



NOTE: Noxious weed map is updated annually by the Minnesota Department of Agriculture -  
90 W. Plato - St. Paul, Minnesota 55107.



ROADSIDES FOR WILDLIFE  
THE (OB)NOXIOUS NINE  
TEACHER SHEET

CROPS, WEEDS, AND ROADSIDES - AN INFORMATION SHEET

The issue at the heart of managing roadsides for wildlife is weeds. Roadside plants are routinely referred to as "weeds". Many people think that roadsides are significant sources of weeds or, if they are to be managed for wildlife in the future, will become significant sources of and refuges for weeds. Furthermore, few township and county weed sprayers can identify the noxious weeds, and especially those beyond the basic nine species. The tendency is to spray anything with broad leaves or to simply spray everything rather than spot spray the noxious weeds. The result is that too many beneficial plants are hurt by our attitudes and lack of knowledge about weeds.

Weeds are the farmers most obvious and aggravating natural enemy. They can be thought of as a natural enemy because weeds and most agricultural crops do well in the same kind of habitat. Both have the ability to take advantage of human-induced disturbance. Unlike weather and climate, weeds can be controlled, at least in varying degrees. However, they are almost always present and ever adapting to proposed control technologies.

Weeds such as Canada thistle, cocklebur, giant foxtail, velvet leaf, and black nightshade emerge throughout the growing season. They are strong competitors for available plant nutrients. Because they can withstand considerable cultivation they are hard to eliminate. Furthermore, they are quite shade tolerant. They can, if not controlled, reduce yields and profits. One result of these kinds of yearly experiences is that farmers are basically opposed to any plant other than the crop that might grow in their field, whether it is on the list or not. All other plants are regarded as "weeds" with all the attributes that designation connotes.

Farmers know a lot about weeds as they appear in their fields and affect their crops. But, they don't really know much about the non-noxious species and, therefore, have little cause to respect or appreciate them. Their attention is on the agricultural environment, not the natural environment. Farmers dislike weeds for the same reason city gardeners do--competition. To each, a weed is a plant out-of-place and each agriculturalist behaves accordingly.

Properly cared for, roadside plants need not be a threat to farmfields. Basically, this is because the noxious weeds that compete effectively with row crops cannot compete in a soil composed of perennial grasses and broadleaf plants. Such cover should consist of at least a half-dozen species that have long-term survival characteristics (25 years plus), are aesthetically desirable and provide snow and erosion control.



## ROADSIDES FOR WILDLIFE

### THE (OB) NOXIOUS NINE TEACHER SHEET

#### MINNESOTA NOXIOUS WEED LAW - AN INFORMATION SHEET

What's in a name? Weeds...Noxious Weeds

Weeds are sometimes referred to as ruderals. They are hardy plants, often introduced from various parts of the world, although they may be native to the area. They grow predominantly where the original vegetation has been markedly and persistently disturbed by human activities (not including, of course, deliberately cultivated plants).

Noxious weeds are annuals, biennials, and perennials which are deemed by the Commissioner of Agriculture to be plants that are injurious to public health, public roads, crops, livestock, and other property. Noxious weeds tend to be difficult to exterminate and show a strong tendency to depress the growth of plants considered desirable by humans.

On a statewide basis the Minnesota Commissioner of Agriculture has identified nine weeds as noxious weeds. In addition to the nine noxious weeds, there are 47 secondary weeds. Each county, by petition, may designate weeds from the secondary weed list as noxious weeds. The petition requires a majority of township supervisors and approval by the board of county commissioners.

At present, counties do not have the authority to add weeds to the secondary weed list. The only way this can be done is through hearing and petition procedures by the Department of Agriculture.

#### Minnesota Statutes 18.171 to 18.323 - A Summary

The Minnesota Noxious Weed Law was enacted for the protection of the residents of this state in order to prevent the injurious effects of noxious weeds to public health, public roads, crops, livestock, and other property. This law and related statutes are under the general administration of the Commissioner of the Minnesota Department of Agriculture. Day to day or routine administration of the state's noxious weed control program is carried out by the Director of the Agronomy Services Division through the supervisor of the Section of Weed Control. Implementation of the noxious weed law is accomplished through several Agronomy District Coordinators located throughout the state. One of their primary duties is to see that local governments fulfill their responsibilities in the actual enforcement of the law. The actual enforcement is carried out by local governments through local weed inspectors in townships and cities and County Agricultural Inspectors in each of the counties.

#### Where Weed Inspection Starts

By law all county board or town board supervisors are weed inspectors. In cities the mayor is the weed inspector. They may appoint or hire assistant inspectors. The town board members and mayor work with the County Agricultural Inspectors. The agricultural inspectors are supervised by one of the the Department of Agriculture Field Inspectors.

ROADSIDES FOR WILDLIFE

THE (OB) NOXIOUS NINE  
TEACHER SHEET  
Noxious Weed Law  
Page Two

Legal Procedures

A general weed notice entitled, "General Notice To Destroy Weeds" is published on or before June 15th of each year in the newspaper. This is a formal or legal notice and it is designed to inform all owners, occupants, agents, or officials in charge of public lands of their responsibility for controlling or eradicating noxious weeds on their land. The county agricultural inspector usually publishes this notice in at least one of the county's legal newspapers each year.

When an individual owner or official in charge of public land fails to control a noxious weed problem after being informally notified, then an individual or legal notice is to be served. This notice can be served irregardless of whether the general weed notice was published or not. If the landowner or any responsible person does not take care of the weed problem, the inspector can order the destruction, and the expense from this is added to the tax statement.

Noxious Weeds In Roadsides

Different governmental units are responsible for roadsides--township, county, state. Any time noxious weeds encompass an area larger than 50 square feet the Minnesota Department of Transportation spot sprays or spot mows the area.



# WILDLIFE IN A CHANGING WORLD

ROADSIDES FOR WILDLIFE  
ACTIVITY 9



**OVERVIEW** In this lesson students examine changes in land use and agricultural practices in southern Minnesota from 1940 to 1984. They consider the impact of changing trends in agriculture on wildlife.

# WILDLIFE IN A CHANGING WORLD

# ROADSIDES FOR WILDLIFE ACTIVITY 9

**OVERVIEW** In this lesson students examine changes in land use and agricultural practices in southern Minnesota from 1940 to 1984. They consider the impact of changing trends in agriculture on wildlife.

## OBJECTIVES

After completing this activity, students will be able to:

- describe the key role played by vegetation in determining the nature of animal communities and the density of population;
- recognize that managing wildlife resources is largely a problem in land (and water) use.

- Which changes were fast? Slow?
- Change is the result of things interacting. What things interacted? What is the evidence for interaction?
- As a result of the change, what was added to the environment? Subtracted from the environment?
- Which of the changes was good? Bad? What evidence can you offer in support of your claim?
- Did any of the changes have a neutral effect? Which one(s)? Why do you say that?

## MATERIALS

- Student Data Sheet: A Patchwork Quilt
- Student Data Sheet: Pheasant Abundance
- Student Data Sheet: Fall Pheasant Abundance and Soil Bank Acres
- Student Data Sheet: Analyzing The Data

## ACTIVITY DESCRIPTION

1. Introduce the lesson by asking students what environmental changes they have read about in newspapers/magazines, or seen on TV, or witnessed in their community. After they have listed a number of events, take five to ten minutes to discuss them. These are some questions which will help guide this discussion:



2. Divide the class into small groups and give them copies of a "A Patchwork Quilt", "Pheasant Abundance", "Fall Pheasant Abundance and Soil Bank Acres", and "Analyzing the Data" data sheets. Explain that "A Patchwork Quilt" shows a section of land that was cover mapped in 1940, 1964, 1972, and 1984. If necessary, clarify the following terms:

**COVER:** The vegetation that covers the ground.

**SECTION:** One-square mile of land (640 acres; 2259 hectares).

**FALLOW GROUND:** Farmable land is not presently being used for crops.

**LEGUMES:** Clover and alfalfa crops.

**SET ASIDE ACRES:** Various government land retirement programs. They were created to regulate over-production and improve grain prices. They were also designed to protect soil resources. Since 1934 to the present, some have been significant benefit to soil and water resources and wildlife habitat; others have provided almost no wildlife benefit and often aggravated soil erosion problems.

3. After students have analyzed the data, use the questions to discuss their interpretations with them.
4. Conclude the lesson by asking these kinds of questions:

- Do these data suggest relationship between pheasants and humans? If so, what?
- What do these data suggest about the potential value of roadside habitat to pheasants?
- How would you find out how many acres of roadside there are surrounding a section of land? How many acres of roadside are there in a township? What assumptions are you making?
- Suppose in 1940, someone had conducted an environmental impact analysis of the proposed land use changes. How would s/he have answered this question, "What is the net gain of the changes in land use, 1940-1984, to all concerned?" What are the positive and negative factors which must be weighed?
- What other species of animals do you think might have similarly been affected by these changes in land use practices?
- What kind of data would you need to find out whether roadsides could have an effect on wildlife populations? What kind of investigation would you design to find out?



## BACKGROUND

Long ago the prairie region of Minnesota (south and west) supported a variety of grassland wildlife species. Because of an almost ideal combination of small grains, row crops, and grasslands (1910-1940), pheasants and many other species of wildlife prospered. As small grains and grasslands were converted to more row crops (1940-1955) wildlife populations steadily declined. After a 15-year decline, pheasant and rabbit populations stabilized because of the abundance of undisturbed grassland nesting cover provided by the Soil Bank Program (1955-1964).

## Background con't.

There is a lot going on in the population dynamics of pheasants that is not shown here, for example, today, eggs laid in hayfields have less than five per cent chance of hatching. Twenty years ago, the success was closer to 30%. Why? For one thing, hay mowing starts at a much earlier date now, and fewer eggs have time to hatch. In addition, small grain fields in the main pheasant range have declined to a third or less of their former acreage. And this is where 40 to 45% of our pheasant crop was produced just a few years back. Fencelines are now absent or reduced to narrow slivers of cover. In addition, odd corners of undistributed, idle land have all but disappeared on today's modern farms.

The needs of agriculture also have a striking effect on the availability of winter cover. Winter losses are serious and often devastating when pheasants lack protective cover. The 60's were hard on the rugged ringneck. Winter storms and starvation in 1961-'62 took about 45% of the population. The March 17-18, 1965, storm raged into Minnesota taking over 50% of the ringnecks. In the winter of 1983-'84, just when breeding populations were again showing signs of recovery, about 60% of the population was lost again. Recovery from these devastations has been slow.

In contrast, the pheasants quickly recovered from storm losses of the late 1930's and early 1940's. This was most dramatically demonstrated following the Armistice Day storm of 1940 and the severe blizzard of a few months later. During each of the next two falls, 1 3/4 million birds were bagged—the highest harvest in Minnesota's pheasant hunting history.

The 1965 storm demonstrated the need for an expanded program to maintain and improve high quality winter cover. It illustrated the inadequacy of winter cover throughout much of the pheasant range in Minnesota. The intensity of this storm was so severe that heavy pheasant losses occurred in many cover tracts which normally provide adequate protection. Although we cannot expect to completely eliminate winter storm mortality, the need for an expanded program to maintain and improve high quality winter cover is obvious. Such cover is declining throughout virtually all the main pheasant range.

Protective woody cover provided by wetlands, farm groves, and field woodlots is being drastically reduced; the number of farms is declining and the land absorbed into larger holdings. In so doing, groves and hedges are being eliminated to facilitate intensive and large scale agriculture. Larger cattail marshes, patches of ragweed, and sandbar willow have slipped away, until today entire townships are left without a single marsh. The result? Pheasants depend more and more on farmstead windbreaks for winter protection.

Row crops are gradually replacing small grains. Since 1940, the amount of land devoted to corn and soybeans in Minnesota has doubled. In the contrast, small grain acreages have been cut in half in central and west central Minnesota. In south central and southwestern Minnesota, the conversion from small grains to row crops is even greater.

Row crops provide an essential food source for pheasants, but ironically, the amount of food these crops provide is less today than it was 25 years ago. This is due to the emphasis on fall plowing, a practice which improves soil texture and productivity, but leaves little food for wintering pheasants.

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### ROADSIDES FOR WILDLIFE A Supplementary Curriculum

Produced By

The Minnesota Environmental Science Foundation, Incorporated  
for the

Pioneerland Regional Environmental Education Council

and the

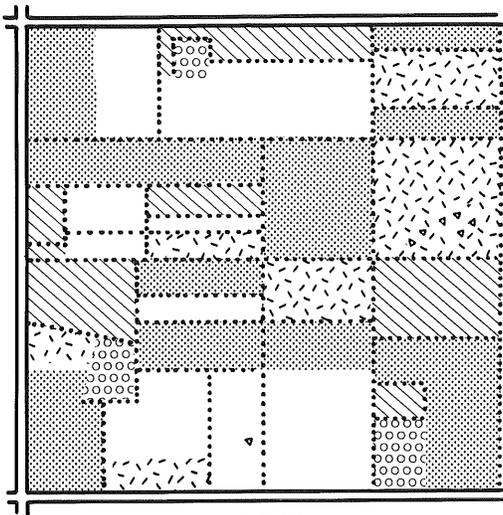
Minnesota Department of Natural Resources, Roadsides For Wildlife Program

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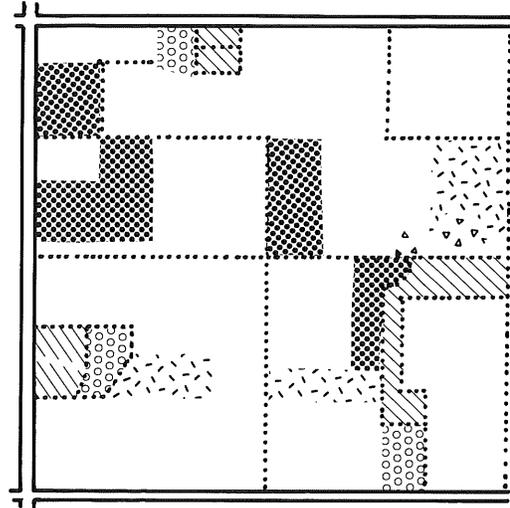
WILDLIFE IN A CHANGING WORLD  
STUDENT DATA SHEET

A PATCHWORK QUILT

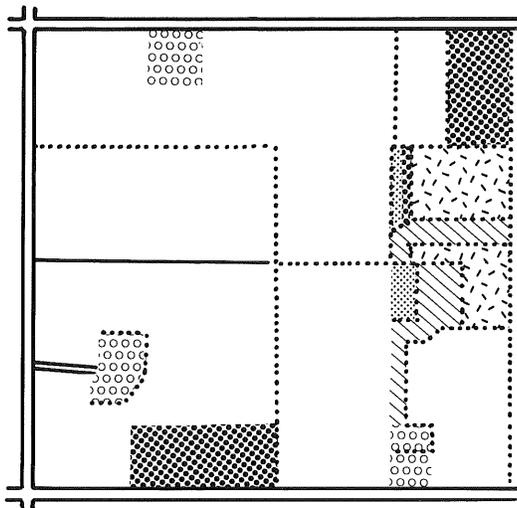
Below are four charts drawn from high-altitude photographs, documenting land use changes in Section 33, Fairmont Township, Martin County, Minnesota: 1940-1984.



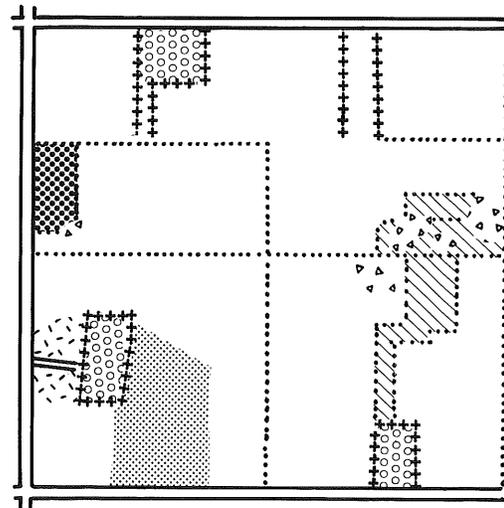
1940



1964



1972



1984

LEGEND

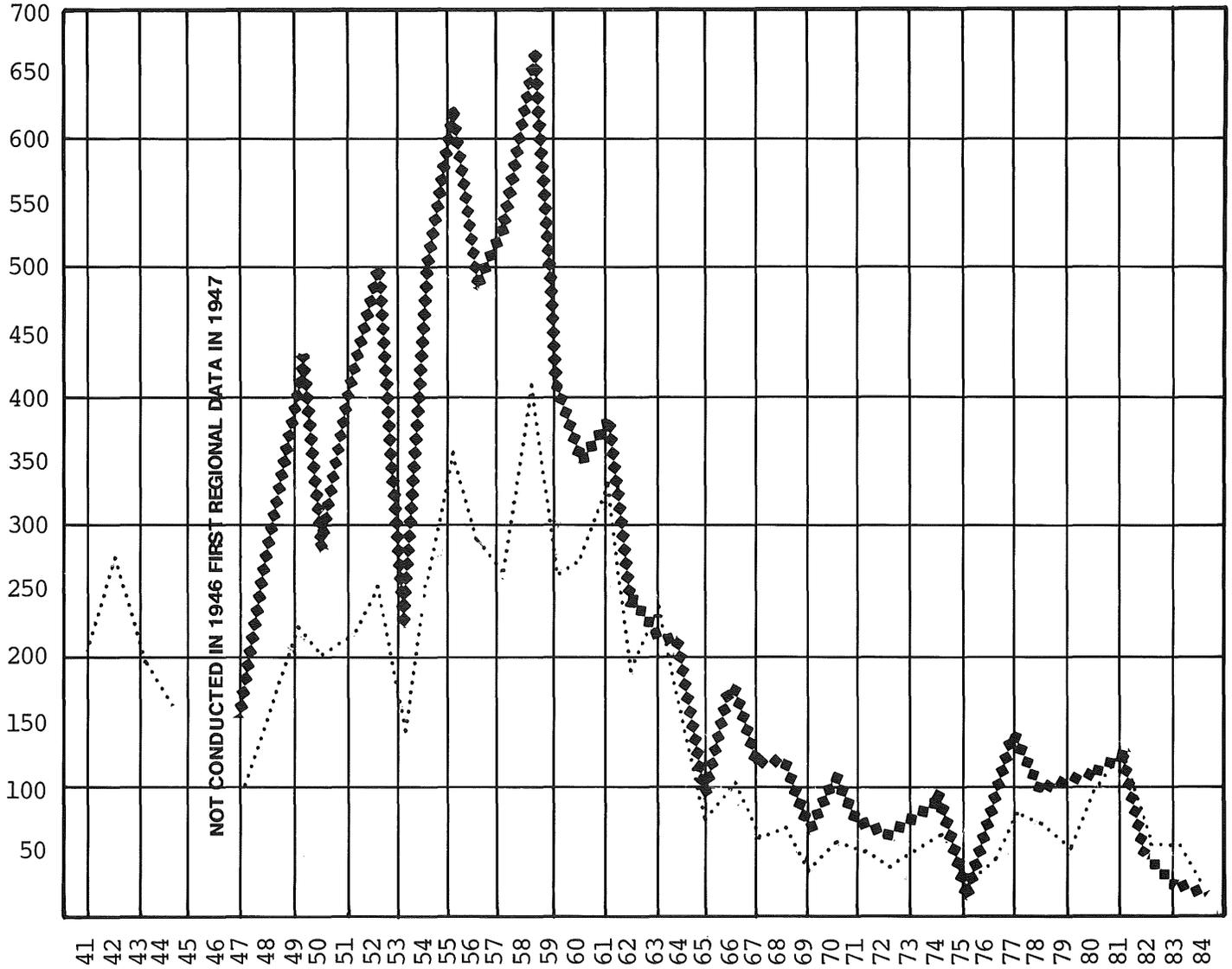
- |  |   |   |
|--|---|---|
|  small grains |  row crops       |  farmstead |
|  pastures     |  odd areas       | ..... fencelines  |
|  legume hay   |  set-aside acres | +++++ treelines   |



WILDLIFE IN A CHANGING WORLD  
STUDENT DATA SHEET

PHEASANT ABUNDANCE

Pheasants seen per 100 miles of August roadside count, conducted annually by the Minnesota Department of Natural Resources.



Pheasant abundance in south central and statewide Minnesota from 1941 to 1984.

◆◆◆◆◆ South central count

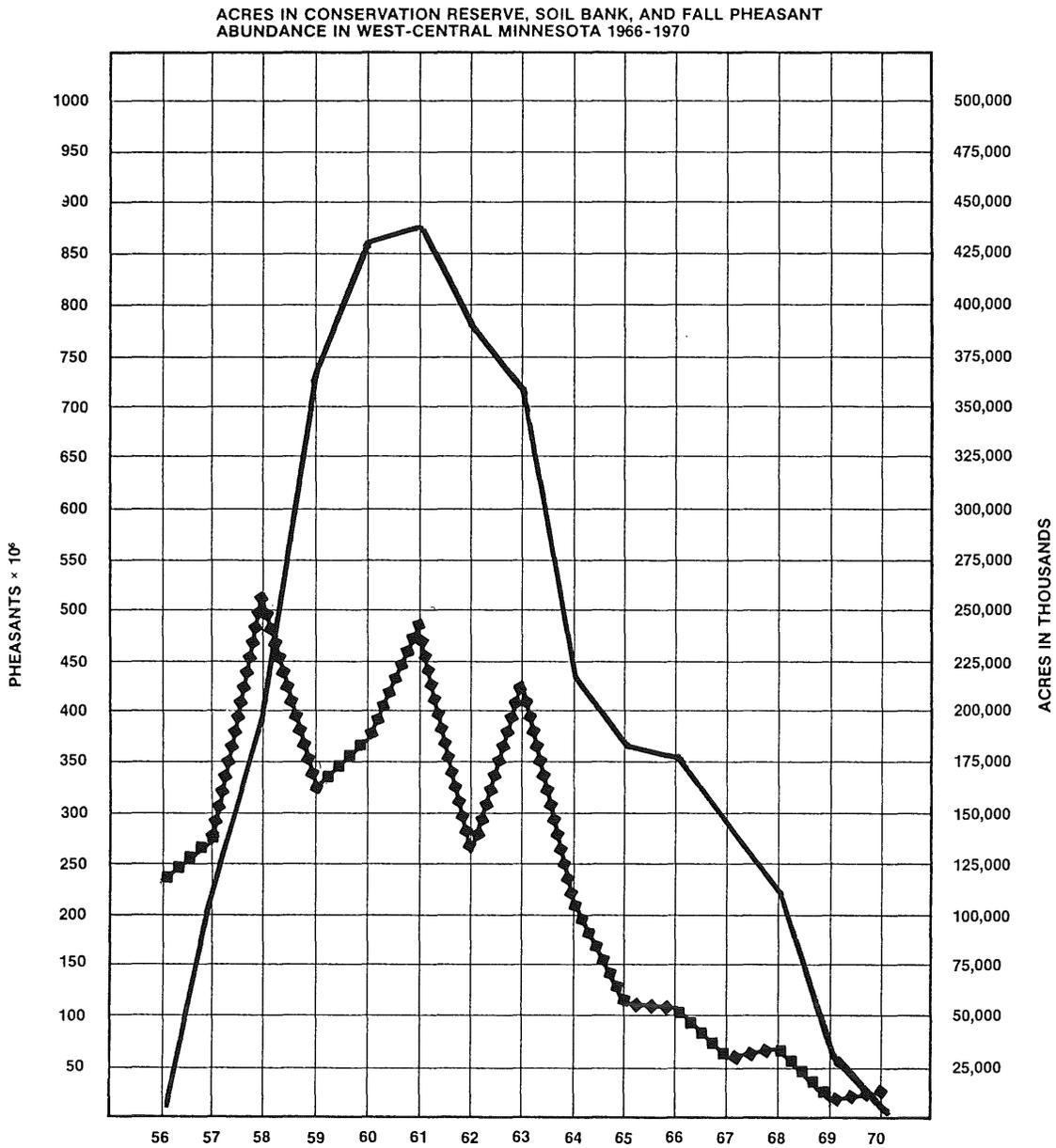
..... Statewide count



WILDLIFE IN A CHANGING WORLD  
STUDENT DATA SHEET

FALL PHEASANT AND SOIL BANK ACRES

10 West-Central Counties  
Minnesota  
1956-1970





ANALYZING THE DATA

1. Does crop diversity increase, decrease, or remain the same? \_\_\_\_\_  
What is your evidence? \_\_\_\_\_

2. What trend do you observe in field size? \_\_\_\_\_  
In field shape? \_\_\_\_\_

3. Pheasant are farmland birds that prefer grassy-type cover in fields, along fencelines, marsh borders, and odd corners of farms. This type of cover also includes oats, wheat, idle fields planted to various grasses and legumes. In winter, pheasants require protection woody cover such as that provided by farm groves, field woodlots, hedges, and cover provided by large cattail marshes. Does the quality of pheasant cover remain the same, improve, or get worse?  
\_\_\_\_\_

4. Examine the "Pheasant Numbers" graph.
- What two variables does this graph illustrate? \_\_\_\_\_
  - What happens to the plant population during the time considered by the graph? \_\_\_\_\_
  - When was the population the largest? \_\_\_\_\_
  - When was the population the smallest? \_\_\_\_\_
  - What was the population in 1940, 1964, 1972, and 1984? \_\_\_\_\_
  - What trend is illustrated by the data contained in the graph? \_\_\_\_\_

5. Examine the graph, "Fall Pheasant Abundance and Soil Bank Acres".
- Jot down some things you notice about this graph. \_\_\_\_\_  
\_\_\_\_\_
  - What variables does this graph illustrate? \_\_\_\_\_
  - Is there any relationship between pheasant abundance and acres in the soil bank program? \_\_\_\_\_ If so, what? \_\_\_\_\_
  - Is the evidence in this graph related to the evidence in "Pheasant Abundance"? \_\_\_\_\_

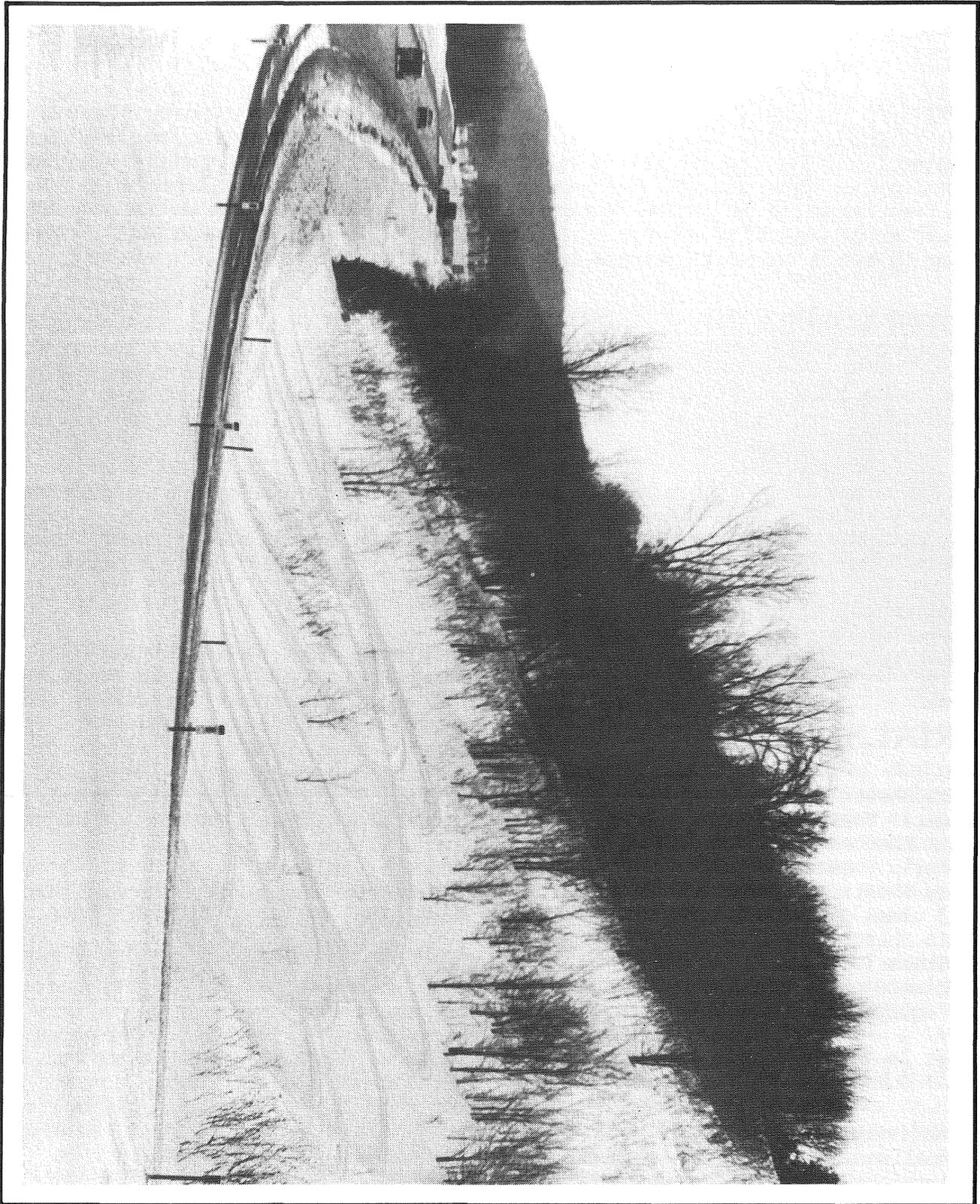
6. Make a hypothesis about the relationship between land use changes and pheasant abundance. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# SOME COOL PROJECTS

ROADSIDES FOR WILDLIFE

ACTIVITY 10



**OVERVIEW** Students make an effort to discover something new to them (not new to the world). Individualized, out-of-class, roadside winter investigation problems are posed. Students formulate hypotheses, develop a working plan, perform an experiment/make observations, gather data, display the data in tables/graphs, and make inferences. Much of the equipment required is of the "junk box" variety. To think that a tin can can become a sampler of some kind may require a little ingenuity (and encouragement). Other necessary equipment is common to science laboratories in schools.

# SOME COOL PROJECTS

# ROADSIDES FOR WILDLIFE ACTIVITY 10

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## OBJECTIVES

After completing this activity, students will be able to:

- use some of the processes of scientific inquiry, for example: state a problem, develop a working plan, perform the work, gather data, and formulate conclusions;
- recognize the effort involved in discovering something new to themselves.

## MATERIALS

Student Data Sheet: (N)icy Roadside Challenges: The Cold Facts  
Student Data Sheet: Roadside In Winter: A Searcher's Research Report  
Student Data Sheet: Coldtrackers (designed for full class activities)  
Student Data Sheet: How to Preserve a Winter Track (optional)  
Standard Science class equipment  
"Junk Box" equipment

## PREPARATION

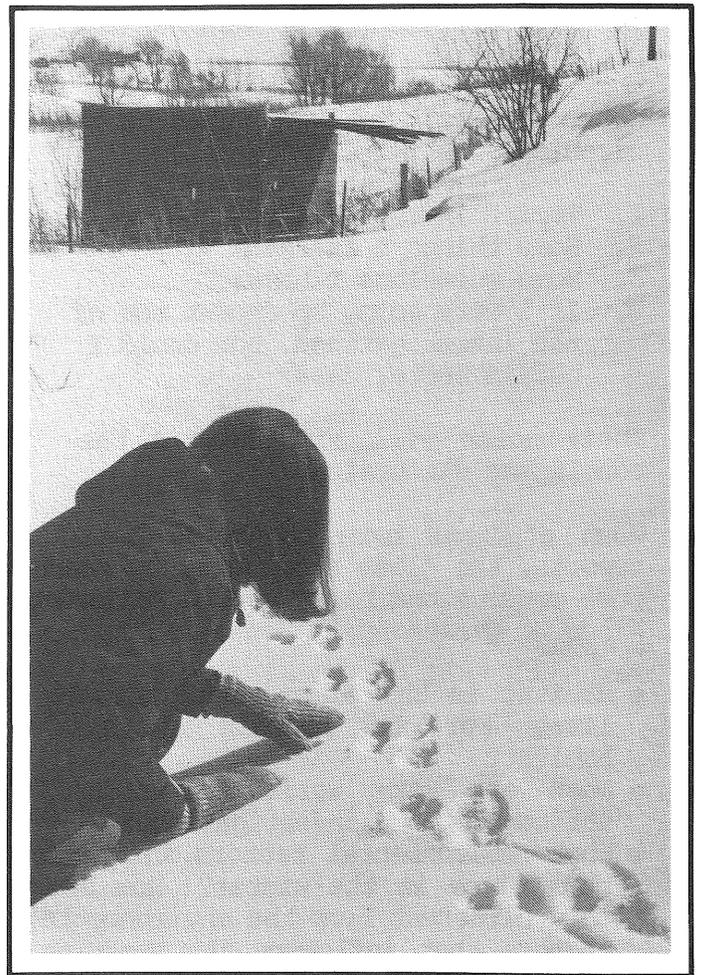
This activity is designed as individualized, out-of-class, winter investigations. Examine data sheets "(N)icy Roadside Challenges" and "Roadside in Winter: A Searcher's Research Report", and think about how you will teach the activity. If you prefer to have the whole class work together, a data sheet, "Coldtrackers", has been included for that option; you will need to determine how "Coldtrackers" challenges can be reported on "Roadside in Winter: A Searcher's Research Report".

The form of inquiry in this activity asks the student to direct the solving process, that is, formulate a hypothesis, develop a working plan, perform the activity, gather the data, and formulate conclusions. You provide aid that limits the frustration to a reasonable level and helps students succeed by asking questions. Your questions should help students think about possible investigative possibilities.

Give some prior thought to materials. The materials and equipment needs for these investigations are simple and varied. They range from the string and sticky tape variety to standard laboratory equipment. Materials include items such as thermometers, magnifiers, shovels, meter sticks, tin cans, filter paper (paper toweling), funnels, balances, water test kits, microscope slides, microscopes, plant food, etc.

The challenges require varying degrees of ingenuity. For example, a snow penetrometer to measure the compactness of snow, might be nothing more than a bolt or nut tied to a fish line and a meter stick. When dropped from a fixed height and the string length measured, the compactness of snow may be measured. Snow microorganisms and algae might grow better if a pinch of plant food is added to a jar containing melted snow. A relationship between salt and distance might be detected simply by evaporation. However, kids will have to "mess about" to find the best sized bolt, the proper "pinch" of plant food, and whether salt residue left from one drop of water provides as good information as from five drops of water.

- Decide whether you will assign the challenges or have students pick one. Not all of the challenges require an experiment, many of them can be done by careful observation alone. Some of the challenges ask students to describe what they see. Do not underestimate the difficulty of seeing. For some students, it may be the first time that they have been asked to describe what they see in whatever terms they can, without relying on someone else's directions on what or how to see.
- Some of this kind of "seeing" invites measurement of one kind or another and you can encourage it. A wind-blown snow pattern may be more easily seen and understood when measurements — length, width, depth — are made.
- Decide on time limits for the investigative work and for completion of the reports. The reports could be due a week or two after investigations.



## ACTIVITY DESCRIPTION

1. Introduce this lesson by picking for discussion one of the challenges found on "(N)icy Roadside Challenges: The Cold Facts". Use some of the following questions to help students think about an investigation.
  - What is the problem to be investigated?
  - What is a hypothesis we might investigate? (A hypothesis is an explanation for something observed or questioned, e.g., a temperature below  $-10^{\circ}\text{C}$  will adversely affect germination rate. A hypothesis is a tentative explanation...a guess.)
  - What will we measure?
  - When will we make measurements?
  - How will we take measurements?
  - What equipment will you need?
  - What piece of equipment could we use to...? Or what if we used a...to measure?
  - How will you use this equipment to answer the problem?
  - What are some ways to represent the data we collect? Graphs? Tables? Drawings? Other?
2. Have students pick a challenge and investigate it. You can have students work alone or in teams or in a mixture of both. Give them a copy of the "Roadsides in Winter: A Searcher's Research Report" and briefly review it. Give them their timelines.
3. Conduct a scientific meeting. Each student/student team should be prepared to give a brief presentation on their research. If you have a large class you can pick a number of students at random to make presentations. However, all the teams should get a chance to make presentations in some form.
 

In the scientific community, poster sessions have achieved essentially equal status with oral presentations at professional society meetings. Use your room as a meeting room, filled with bulletin boards on which the participants place graphs, diagrams, data, pictures, and a small amount of text to illustrate the main points of their research. The class can walk and wander through the room as in a museum.

To assist students in viewing the poster session, ask each of them to copy these four statements onto notebook paper and take votes as they circulate:

1. Topics investigated:
2. Some things I learned:
3. Some questions I have:
4. If I were going to repeat one of the investigations, how could I obtain better data?

Their notes will aid them in the concluding discussion.

4. When students have completed their reports, the class should try to reach some conclusions based on the following kinds of questions:

- Habitat is the place where animals live. For what animals is this habitat?
- What are some variables which influenced your investigations?
- What environmental factors influence this place in the winter? How are they different from the environmental factors that influence the roadside in the summer?
- Children need experiences through which they can uncover and discover relationships. The concept of the ecosystem requires us to think of many variables, all working together at once, continually affecting and modifying one another. The complexity of this concept requires many experiences, learning, and an ability to think abstractly. Attempts at exposing relationships can help students to think about the dynamics of roadsides (as well as their surroundings) and contribute to a better understanding of the ecosystem concept. You can help them gather their experiences.

Indicate any relationships you think you have discovered. Put these word pairs on the board and connect them with lines. A discussion of these relationships should stimulate vigorous differences of opinion. You can help students think about the strength of the relationships: What is the evidence? What additional information is needed? How do we know? And why do we accept or believe it?

- What additional experiments does this work suggest? Which one would you like to do?
- What is something you learned about conducting an investigation?
- What was the hardest thing about this assignment?
- Is there anything you especially liked about the work? Disliked?

## EXTENSIONS

1. Open the display to the entire community. Because different students have investigated very different topics, all related to the ecology of roadsides in winter, persons who attend will leave it knowing more than before about roadsides in winter and ways they can be studied.
2. Students may be interested in learning how to preserve winter tracks of animals. "How to Preserve a Winter Track" provides a list of materials, directions, and some additional challenges.

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A Supplementary Curriculum

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(N) ICY ROADSIDE CHALLENGES: THE COLD FACTS

- |   |
|---|
| 1. Is there a relationship between roadside snow depth and vegetation height?   |
| 2. How much snow falls in roadsides?  |
| 3. What lives in roadsides in the winter?   |
| 4. What can you learn from tracks in the snow about the critter that made them?   |
| 5. How do you account for the pattern of snow in a roadside?  |
| 6. How do the tracks of an animal change as the animal goes from a roadside habitat to another habitat?   |
| 7. Do frost crystals favor certain plants or locations. Go outside early in the morning after a calm night when the temperature has dropped below freezing.   |
| 8. Northern people have more than a dozen specialized snow terms. For example, in Alaska, the Kobuk Valley Eskimo, differentiates Qali (snow that collects on trees) from Api (snow on the ground). How many different types of snow can you find? Make up words to describe different kinds of snow. |
| 9. How does the density of snow vary in a roadside?   |
| 10. Does the amount of water in snow vary from place to place?  |
| 11. What is the range of snow temperatures in a roadside?   |
| 12. What is the range of air temperatures in a roadside?  |
| 13. How does the relative compactness of snow vary in a roadside?   |
| 14. How many different kinds of animal signs can you find?  |
| 15. What evidence can you find of animal activity under the snow?   |
| 16. How clean is snow in a roadside?  |



ROADSIDES FOR WILDLIFE, Activity 10  
SOME COOL PROJECTS  
STUDENT DATA SHEET (continued)  
Page Two

17. Is snow from the road side of a roadside habitat different from the snow from the field side of a roadside habitat?
18. What factors influence the melting of snow/ice in a roadside?
19. Is there a temperature difference under undisturbed snow and under snow compacted by a snowmobile or footprint?
20. Will plants under snowmobile tracks show more damage than plants under undisturbed snow?
21. Do microorganisms live in snow?
22. How does snow in a drift vary from top to bottom?
23. Do insects use roadsides in the winter?
24. Do the insects in the vegetation of a winter roadside differ from the insects in an adjacent winter cornfield?
25. Does the amount of snow that falls in a roadside during a snowstorm differ from a field? A wooded area? Your lawn?
26. Does the pH of the surface of the snow vary in a roadside?
27. Does the pH of snow in a roadside vary from top to bottom?
28. How cold is snow in a roadside?
29. Does the amount of water in snow in a roadside vary from top to bottom?
30. What can you learn about soil erosion by studying a roadside in the winter?



ROADSIDES IN WINTER; A SEARCHER'S RESEARCH REPORT

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

BRIEFLY, DESCRIBE THE PROBLEM YOU CHOSE TO INVESTIGATE:

Empty box for describing the problem to investigate.

MATERIALS

Empty box for listing materials.

PROCEDURE (WHAT I DID)

Empty box for describing the procedure.



ROADSIDES FOR WILDLIFE, Activity 10  
SOME COOL PROJECTS  
STUDENT DATA SHEET (continued)  
Page Two

PROCEDURE (continued)

OBSERVATIONS (TABLE/GRAPH/DRAWING/MODEL)

INTERPRETATION (INFERENCE)



COLDTRACKERS

Find as many different kinds of snow as you can.

Learn everything you can about a snow bank—  
top to bottom.

Find the warmest place and the coldest place.

Find evidence — <sup>TOP</sup> SNOW — that animals use this  
<sub>UNDER</sub>  
place and use the evidence to reveal one thing  
about the animal.

Find a snow pattern and try to decide what caused it.

Find as much evidence as you can that humans  
influence this place.

What is the relationship between the vegetation of a roadside and a snowdrift?

For late and early winter. How would you account  
for a pattern of snow melting in a roadside?



## ROADSIDES FOR WILDLIFE, Activity 10

### SOME COOL PROJECTS STUDENT DATA SHEET

#### HOW TO PRESERVE A WINTER TRACK

You can collect and preserve animal tracks in the snow. It will take some practice but you can learn how to make some excellent Plaster of Paris casts. This sheet tells you what you need and how to make the casts.

#### IMPORTANT SAFETY NOTE

To further harden and make the Plaster of Paris cast permanent, the procedure suggests boiling the cast in a solution of borax. If you do this, it should be done using strict laboratory safety procedures. This also means wearing safety goggles. You and the teacher are working with chemicals. Borax (sodium borate, tetra) hazardous substance, toxic by inhalation and ingestion. Your teacher should mix the solution (one tablespoon borax to one pint of water). The hardening procedure may also be omitted.

#### MATERIALS

Containers, disposable cardboard/paper cups  
Atomizer, trigger style/window cleaner bottle  
Plaster of Paris, slow drying variety  
Salt shaker  
Salt  
Tongue Depressors  
Flexible cardboard/heavy paper, 5 cm wide. Strips must be long enough to circle the track.  
Spoon  
Paper clips  
Brush, round, camel hair, long handle toothbrush, soft  
Jars for water, Plaster of Paris

Optional: Borax  
Tempera paint  
Varnish/Shellac  
Hairspray  
Lacquer spray, clear  
Plastic spray

1. Choose fresh, distinct tracks in firm snow.
2. Lightly brush out newly fallen snow or any snow debris.
3. Mist the surface of the track with cold water. Let it freeze.
4. Make a cardboard collar large enough to enclose the track and fasten it with a paper clip. Then, insert it about 1 cm into the snow.
5. Mix Plaster of Paris and water in a cup. Stir it to remove the lumps. The mixture should be the consistency of a thin pancake batter. Just before you are ready to pour it, add a few sprinkles of salt and stir.



6. Carefully pour the mixture into the track and then fill the collar to within about a centimeter of the top. Gently tap the collar with your finger or brush handle. This will help remove any air bubbles and also distribute the mixture throughout the track.
7. Wait. It will take about an hour for the cast to harden.
8. Optional. Requires a teacher's supervision. If you want to thoroughly harden the cast you must boil it in a borax solution for twenty minutes. Use one tablespoon of borax for each pint of water.
9. The cast can then be painted and varnished.

#### TRACKING CHALLENGES

If salt were not added, would the Plaster of Paris behave differently?

If more salt were added, would the Plaster of Paris behave differently?

Would the Plaster of Paris cast be as distinct if the print was not sprayed first?

What type of salt works best?

- a. Sea Salt
- b. Table Salt
- c. Rock Salt
- d. De-Icing salt used on driveways and sidewalks

Does hairspray work as well as water mist?

Does a clear lacquer spray work as well as water mist?

Is there a difference between hairspray and plastic spray?

What if you substituted sugar for the salt? Bicarbonate of soda?



# A DISAGREEMENT IN BLOOMING GROVE TWP

ROADSIDES FOR WILDLIFE  
ACTIVITY 11



**OVERVIEW** In this lesson students become members of a township board. A farmer asks the township board to take an active role in promoting roadsides for wildlife. Students make a decision and discuss it. The lesson concludes with consideration of the effectiveness of actions the farmer might use if the board rejected the request. The lesson raises questions about private values and community values. It also explores the use of law and regulation in promoting environmental improvements in the interests of sound wildlife management.

# A DISAGREEMENT IN BLOOMING GROVE TWP

# ROADSIDES FOR WILDLIFE ACTIVITY 11

**OBJECTIVES** In this lesson students become members of a township board. A farmer asks the township board to take an active role in promoting roadsides for wildlife. Students make a decision and discuss it. The lesson concludes with consideration of the effectiveness of actions the farmer might use if the board rejected the request. The lesson raises questions about private values and community values. It also explores the use of law and regulation in promoting environmental improvements in the interests of sound wildlife management.

## OBJECTIVES

After completing this activity, students will be able to:

- recognize that the future of roadsides as desirable wildlife habitat is very strongly influenced by a number of seemingly small local decisions, e.g., attitudes, spraying procedures, maintenance, revegetation policy, etc.;
- compare attitudes and values toward roadsides;
- describe methods used to mobilize and change attitudes in public policy decisions, and assess their effectiveness.

## MATERIALS

Student Data Sheet: Blooming Grove  
Township Board Member Decision Sheet  
Student Data Sheet: Rating the Action  
Teacher Data Sheet: The Johnson Testimony

## ACTIVITY DESCRIPTION

1. Read "The Johnson Testimony" to the class. Ask students to imagine themselves as members of the local township board as they listen to the presentation. Remind students that a township consists of 36, one-square-mile sections, with few exceptions; and that a township board is a unit of local government.

There are both male and female farmers. To avoid sexism and also to encourage, even if only indirectly, the idea that farming is a career for all, the spokesperson in the statement below will be referred to by last name only.

2. Give students a copy of "Blooming Grove Township Board Member Decision Sheet". Have students check the box of the alternative that they would choose. As you discuss the alternatives, use these kinds of questions:

- What are some of the positive and negative consequences of your decision?
- What are some of the conflicting values in this situation? Place the following line on the board and record the responses.

$$v_1 \text{-----} v_2$$

- How are these values related to some of the high level social values of our political tradition?
- Do you think township boards should be caretakers of traditional community values or leaders in changing community values?
- What might happen if most people refused to believe that roadsides are of significant value to both game and nongame wildlife?



- What if you were a farmer and you felt that the hay you harvested from roadsides contributed to your livelihood? In fact, you want more than one cutting. Would your position change?
  - Tally the class responses. Do you think this is how our township supervisors would respond? How could you find out?
3. Suppose the Blooming Grove Township Board of Supervisors denies Johnson's request. Ask students: "What are some actions Johnson might take to get them to change their minds?" List these on the board. Your list should include quite a range of alternatives. If you think students have missed some, ask "What if someone were to suggest personal persuasion or that Johnson run for office or conduct an evening public education program or...?" Add the ones to the list you and the class agree on. Number them and distribute copies of "Rating the Action".
4. Finish this lesson with a discussion of the actions. You can use these kinds of questions:
- Which actions would have the most impact? The least impact? What are your reasons for each? Does anyone have a different point of view?
  - Are the least direct actions desirable or undesirable? What purposes might they serve?



- Where are some places Johnson could go for help? What kind of help might Johnson get? (Students may not know that the Minnesota Department of Natural Resources has a Roadside Wildlife Specialist. Is there a way this person could be used?) How effective would this help be? Would township board members be wary or even resistant to such help? Why? Would the help still be useful?
- Suppose Johnson decided to put a sign, a kind of historic marker explaining the importance of roadsides to wildlife in a roadside. What would the sign say? Would it be a useful thing to do?
- How do you think a township board member would react to our list of actions? What information do you think s/he would say is most important in making a decision about a township issue?
- Do you think that the idea of getting a lawyer and taking the issue to court would strike most people as a breach of neighborliness? Would you do it?
- Which one(s) of these actions are likely to be regarded as pressure tactics? Would it invite resistance?
- This lesson assumed that Johnson presented these ideas for the first time to the township board. Suppose Johnson had tried to line up some votes ahead of time...had approached and talked with board members privately. Would this be useful or not?
- What do you think of the strategy of Johnson trying to get a board member to introduce these ideas rather than Johnson himself?
- One of our constitutional guarantees is a provision for the general welfare or "the general good". Put the following categories on the board:

I. Individual Goods, II. General (Societal) Goods, III. Biological Community Goods

Have students state items - "goods" - which go under each heading. Draw lines between goods in conflict. What are some clues or indicators you could use to tell when the goods of the biological community are being met? Not being met? Which is the most general and important of the goods?

# EXTENSIONS

1. Try to get your township board to consider changes in roadside management policies that would be beneficial to wildlife. This will require students to research present policies and to learn how to make a request. It is important for students to do their homework before they appear.

Even if students are unwilling to go this far, and it is a giant step, encourage students to consider attending a township board meeting. It may be less than exciting. Local politics is not the stuff of headlines, but local politicians make lots of decisions. They decide whether to trim weeds or spray them with herbicide. They make decisions about roadsides that have long term implications. When you get back to class, analyze the long-term implications of their decisions.

2. Students may not know where to start in being a decision maker. One place to start, and you might be able to help students with this, is by developing a clipping file. Have students help you find the local political news about roadsides. What are the issues? How does the township inform farmers about roadside management practices? What are the penalties for not following them? Who are the players? Where is the information recorded? What weeds are regarded as problems in your township? What is the annual mowing date? How are weeds controlled?
3. Have representatives of the class interview a township board member, past or present, to elicit their thoughts and feelings about how this lesson compares with real life. What is missing that would make it more like real life?

ACKNOWLEDGEMENTS. This lesson has a number of antecedents. The most immediate is Methods of Persuasion, a lesson in the "Curriculum About Toxic Chemical Hazards in the 80's", Title IV, Part C. P.L. 95-561, St. Anthony Public Schools.

BLOOMING GROVE TOWNSHIP BOARD MEMBER DECISION SHEET

- Take no action. This is not a serious problem in our township. This is the first time I have ever heard this kind of request.
  
- Propose rules that in the future would promote adherence to a township-wide uniform roadside mowing date, require that spray operators be able to recognize and distinguish between noxious weeds and beneficial roadside plants, limit mowing for snow control to shoulder mowing and/or spot mowing of trouble spots only (the latter to be done in early Fall), and adopt a native grass seeding policy.
  
- Propose a different rule with specific changes and/or additions. These are:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
- Delay action. Propose that there be a public hearing on these issues at the next meeting of the board to find out what other residents think.
  
- Suggest that the board pass a resolution of support encouraging landowners to delay mowing but to leave the decision up to them. You argue that this is a tight-knit community, you have a history together, and that confrontation is not the political style in Blooming Grove Township. You also argue that it is undemocratic to impose your values on others. You think more can be done and should be done with "coffee-cup" diplomacy than with rules and ordinances.



RATING THE ACTION

Rate each one of the actions from -5 to +5 and give reasons for your choice ("+" means effective; "-" means ineffective).

Item #	Action	Rating	Reason
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			



## ROADSIDES FOR WILDLIFE, Activity 11

### A DISAGREEMENT IN BLOOMING GROVE TOWNSHIP TEACHER DATA SHEET

#### THE JOHNSON TESTIMONY

My name is Johnson, I own--I should say the bank and I own--and operate a 320-acre farm (points to map on the wall) in Section 3, Blooming Grove Township. I am proud to be farming the same land that my parents and grandparents did.

My farming practices, like most I'd guess, are quite different from those of my parents and grandparents. I farm, more-or-less, every acre. They didn't. There were always some odd acres of land left around the farm. I haven't yet gotten rid of all of the fence rows, like my neighbors have, so that it will be easier to use some of my bigger equipment, and don't expect that I will.

Like many of you, I can't decide on whether changes in the way we farm today have been good or bad. I don't know whether it's me, or advances in farm technology, or farm policy, or all of them, that have forced me to trade my independence as a farmer to become somebody else. I am also not quite sure what to call that new farmer but it has something to do with the way we now market our products. My mom and dad used to be more self-sufficient farmers; me, I'm more of a specialist. Sometimes I think I am not all that different from a worker on a production line.

Farmland, we are told, is a renewable resource. I am not sure about that anymore. Maybe it is more like iron ore or uranium or oil than we think. The papers and magazines I read are filled with articles describing concerns about increasing soil erosion, loss in soil fertility, and even threats to water supplies from chemicals in the soil. Sometimes I think I have probably contributed my share to those problems.

One effect that I know I have had for sure is on wildlife, especially pheasants. I don't see them around like I did when I was growing up. Blooming Grove Township, for the most part, still has its roadsides. The DNR people tell us that roadsides are a kind of refuge for wildlife. They can provide acres of permanent, relatively undisturbed nesting cover for pheasants and other birds. I am here to ask the Commissioners of Liberty Township to do four things:

1. Make a rule to delay all mowing of roadsides for hay until after August 15th. By then, most pheasants and other bird nests will have hatched.
2. To use herbicide sprays for control of weeds very sparingly. Last year I noticed several places where a whole bunch of plants other than weeds got sprayed. As a matter-of-fact, several whole sections of roadsides got sprayed. I think sprayer operators could be trained to recognize noxious weeds. After all, there are only nine of them.
3. To mow only the immediate road shoulder in early fall where are concerns about snow drifting across the road. This cutting would be only one or two swaths wide.
4. Whenever a new road grade is being built, it is to be seeded to a dense stand of grasses and/or a grass legume mixture (i.e. warm season native grasses with a light stand of alfalfa for nitrogen and start-up cover) rather than shallow-rooted, short-lived, or high maintenance seed mixtures used now.

What do you recommend?



## ROADSIDES FOR WILDLIFE, Activity 11

### A DISAGREEMENT IN BLOOMING GROVE TWP TEACHER DATA SHEET

## THE VALUE OF TOWNSHIP ROADS

The management of roadsides for wildlife depends on a variety of factors. Simple awareness of roadsides and their possibilities, accompanied by attitude changes, especially in terms of delaying or even eliminating roadside mowing, are important, if roadsides are to provide the potential that many wildlife experts think is possible.

Communities are more than agglomerations of people living more-or-less in the same place. The idea of community, at least as it is used here, implies a group of people with shared attitudes and values. The idea that comes to mind of course, is a small town. However, there are other possibilities. Elected officials, for example, at the township level, are, in their own way, both transmitters and controllers of community values, those of the township.

In a recent Supreme Court decision, Justice Warren Berger said "Elected officials express the views of their community; they may err, of course, and the voters may remove them."

One way community values are expressed may be in roadsides. In some ways, roadsides are like towns or cities. You can often tell a neighborhood by the way its lawns are maintained. They tell you what things are prized and what things are not. A township might be more difficult to differentiate but what is the annual mowing date, How are weeds controlled? Is any broadleaf plant growing in a roadside, by definition, a weed? How and when does mowing take place to relieve concern about snow drifts? Do township board members "look the other way" when roadsides are encroached upon by certain land use practices? Are there explicit/implicit policies, and what are they, etc.?

Awareness and attitude changes are clearly related to governance. The future of many Minnesota roadsides will be, to a large extent, influenced by local decisions. In Minnesota, there are some 218,000 acres of land along township roads. They are influenced by Township Board decisions made about mowing for hay and snow control, and about weed control measures. Townships do not have jurisdiction over roads; they just have a lot of control. There is tremendous variety in the way townships influence the maintenance of roadsides.



# THE FUTURE IS NOW

ROADSIDES FOR WILDLIFE  
ACTIVITY 12



**OVERVIEW** How will they know who we were 50, 100, or even 200 years from now? What traces, clues and evidence can we leave for great-great-great-great grandchildren and others to give them an idea about us: What we value, what our hopes and dreams are for the future, and what our society was like?

In this lesson students select ten pieces of evidence to represent roadside habitats; five of them for, "This is the way they were back then", and five of them for, "This is the way I hope they will be for you".

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## OBJECTIVES

After completing this activity, students will be able to:

- create an alternative future;
- identify their own values and the values of others;
- organize, select, and relate ideas and to develop them in a coherent manner;
- discuss the nature of evidence;
- describe some factors that might promote or inhibit change.

The lesson is an acknowledgement that people can be active in creating their futures. The future, or futures, is shaped by the past (things that cannot be changed), the present (what we do and do not do; choosing/not choosing), and the future (events we can/cannot control or influence).

2. Say to students, "If you had the chance to let future generations know about roadside habitats today, what evidence would you leave them? I want you to select five pieces of evidence to represent roadside habitats the way they are today and five pieces of evidence to represent roadside habitats the way you would like them to be for future generations—for your great-great-great grandchildren. The evidence is to be attached to the outside of two brown paper bags. Only one of the clues can be a written statement. One clue can be a photograph or picture. The others are up to you. They can be objects. If a clue cannot be attached, place it in the bag. If an object is too large or impractical to bring, make a sketch of it or somehow represent the object."

## MATERIALS

Two paper bags per student  
Student Data Sheet: Thinking About The Exhibition  
Student Data Sheet: Roadside Matters of Importance

## ACTIVITY DESCRIPTION

1. Begin this activity by telling students that they have become informed about, investigated the ecology of, and considered issues associated with roadsides. This activity is designed to help them think about the future of roadsides.

Your bags are due the next class period. Put your name on the inside of the bag and be sure to label them: P for present and F for future.

3. Place the bags around the room so that students can look over the display. Give students a copy of "Thinking About The Exhibition" and provide them time to examine the collection.
  4. Conclude the lesson by asking some of these questions:
    - What evidence/traces/objects appeared in more than one collection?
    - What evidence appeared only once?
    - What evidence was most effective in describing current roadside habitats? Future roadside habitats? What is your reason for saying that?
    - What evidence shows appreciation of the natural world?
    - What are some assumptions we have made?
    - What are the chief features of today's roadsides?
    - What are the chief features of tomorrow's roadsides?
- What choices do you think future generations will find most agreeable? Least agreeable? What makes you think that?
  - What things do most of us want to see changed? What are some things most of us do not want to see changed?
  - What are some things you can do to make your preferred future happen? If that didn't work, then what? Who could help you?
  - What happens if you do not make the effort? Who will?
  - Do you care what happens to roadsides? Does anybody care? Who? What difference can s/he make?
  - Who controls actions that influence the nature of roadside habitats (grassland communities)? Who should control them?
  - Has this been a useful way to think about the future? If you were to do this assignment again, how would you change it?



5. Examining our values can be important to us as individuals. Sharing these insights with others can lead us to greater understanding of self and others. Some values exercises are found in the data sheet "Roadside Matters of Importance". The exercises provide a basis for class discussion.

- Suppose you were asked your reaction to a decision that would allow all

roadsides to be cultured. (This includes regular mowing for neat appearance and the production of food for people and livestock.) How would this action produce change? What results would you anticipate in the immediate future? In the distant future? What are the benefits? What are some possible unanticipated results? Would you support the decision or not? Why?

ROADSIDES FOR WILDLIFE, Activity 12  
THE FUTURE IS NOW  
STUDENT DATA SHEET

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

THINKING ABOUT THE EXHIBITION

It is the year 2275 A.D. You have been invited to an exhibition to view the contents of a time capsule. Answer the following questions.

PRESENT  
(Then)

FUTURE  
(Now)

What are some similarities and differences?

_____	_____
_____	_____
_____	_____

Which is the most effective bag? Why?

_____	_____
_____	_____

Pick a value that was a good one then and still is now. Write a sentence justifying your rating.

\_\_\_\_\_  
\_\_\_\_\_

Pick a value not useful in the future. What should replace it? How can it be changed?

\_\_\_\_\_  
\_\_\_\_\_

What do you infer (conclude) from this exhibit?

_____	_____
_____	_____



ROADSIDE MATTERS OF IMPORTANCE

"Value" is a word with many meanings. A philosopher, Matthew Lipman, at Montclair State University (New Jersey) says that values are "matters of importance". In the boxes below you will find four different ways of thinking about roadside values.

BENEFIT is the value of a thing... its worth in relation to other things. In Column A, rank order the benefit to society today of each item from 1 (most) to 6 (least).

- | A   | B   |   |
|-----|-----|---|
| ( ) | ( ) | Recreational ("Bird-watching, berry-picking, etc.")                         |
| ( ) | ( ) | Educational ("Learning about roadsides")                                    |
| ( ) | ( ) | Ecological ("Interrelationships between living things and the environment") |
| ( ) | ( ) | Aesthetic ("Beauty")  |
| ( ) | ( ) | Affection ("Emotional Attachment")  |
| ( ) | ( ) | Existence ("Just knowing roadsides are alive and well")                     |

ATTITUDES represent our preferences. In column A, rank order your preferences from 1 (most) to 5 (least). In Column B, rank the preference of future generations.

- | A   | B   |            |
|-----|-----|------------|
| ( ) | ( ) | Roadsides  |
| ( ) | ( ) | Lawns      |
| ( ) | ( ) | Cornfields |
| ( ) | ( ) | Hayfields  |
| ( ) | ( ) | Prairies   |

CULTURE refers to the entire way a society lives. This includes many things: customs, ideas, traditions... and all the values. Values may change in a culture.

What are some ways of today's values about roadsides?

Underline those values that will still be useful in the future. For values without lines, what values should replace them?

ECONOMIC refers to the \$\$\$\$ value of roadsides.

Managing roadsides should be done in ways that help wildlife even if this results in higher taxes. (circle one)  
Agree/Disagree

Incentives are any action, award, or reward that encourage people to act. What are some incentives that would encourage people to act in behalf of roadsides?

