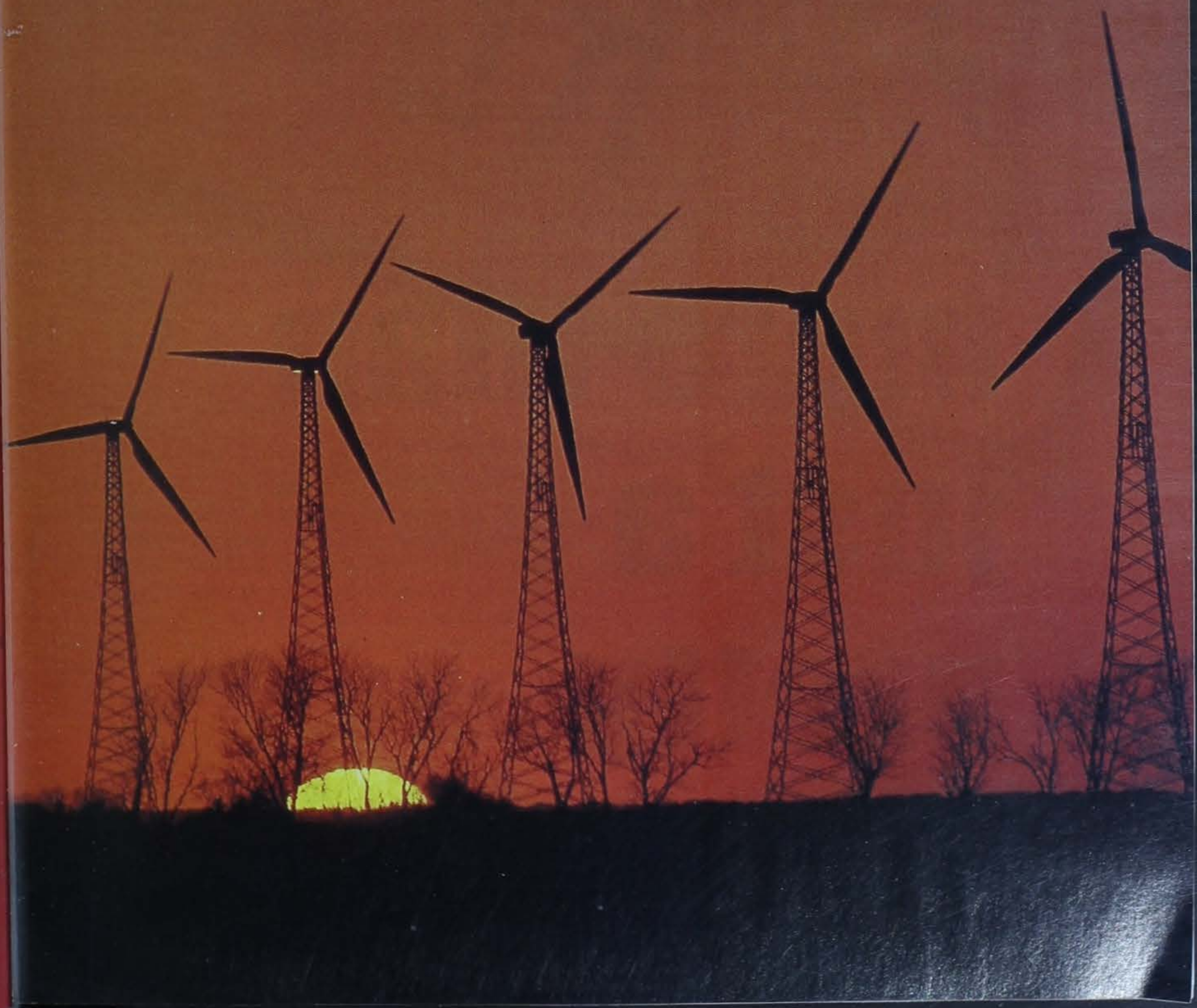
MAY/JUNE 1999

IOWA CONSERVATIONIST

DEPARTMENT OF NATURAL RESOURCES



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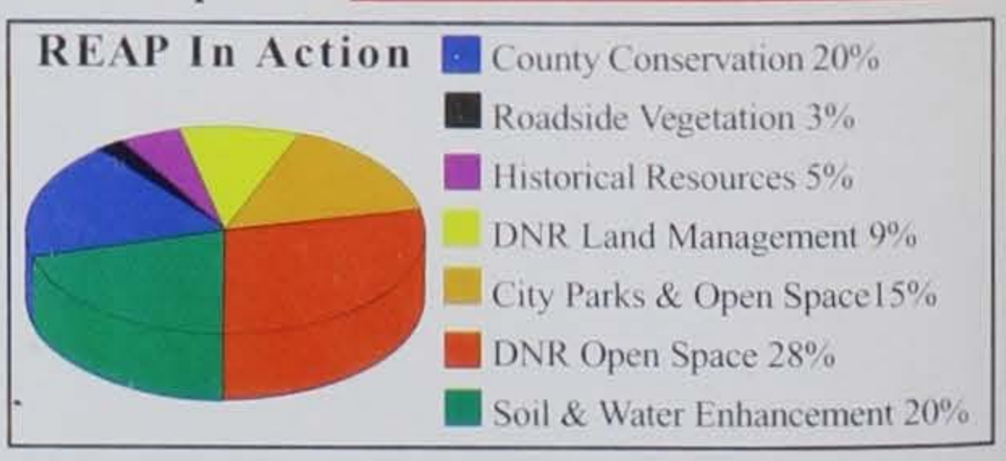

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COVERS

FRONT — Wind turbines near Buena Vista by Clay Smith
BACK — Des Moines River, Dolliver State Park by Ken Formanek


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FEATURES

DEPARTMENTS

BACKYARD CONSERVATION

It'll grow on you.

Farmers and ranchers and many homeowners are making progress in natural resource protection. You can join their conservation tradition right in your own backyard.

There are nearly 2 billion acres of land in the United States. About 70 percent of that land is privately owned, and care of that land is in the hands of those who live and work on it. Most of that land, 1.4 billion acres, is managed by farmers and ranchers. Farmers and ranchers use conservation plans to help them apply practices that meet their production objectives and protect soil, water, air, plant and animal resources.

We hope you'll enjoy these tips to bring beauty and diversity to your yard -- whether your "yard" is measured in acres, feet or flower pots. We know you'll feel good about improving the environment and joining the conservation tradition of America's farmers and ranchers.

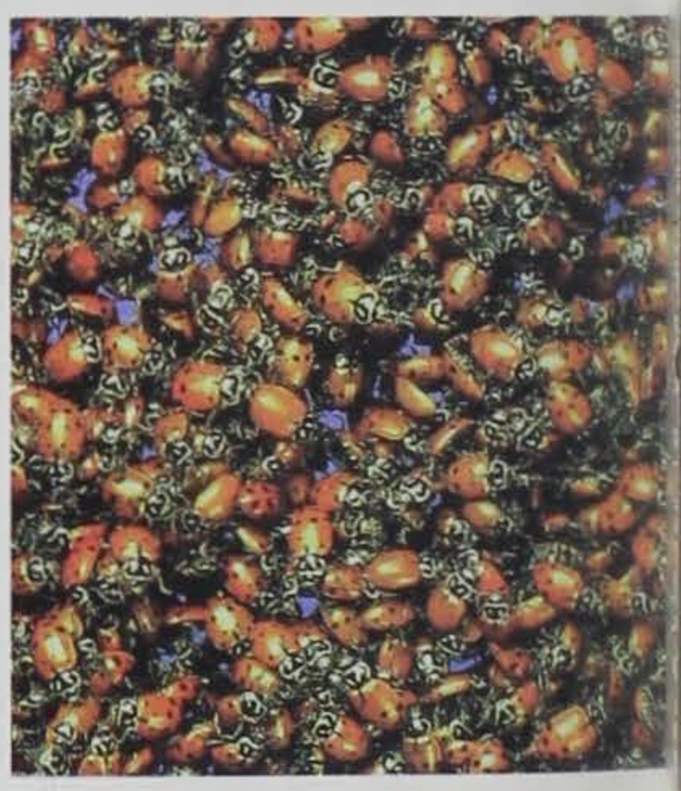
The following are three tip sheets from a series of 10 on backyard conservation available from the USDA Natural Resource Conservation Service.

Pest Management

Early detection and treatment of pests means a healthier growing environment.

In your backyard

Pest management can be one of the greatest challenges to the home gardener. Yard pests include weeds, insects, diseases, and some species of wildlife. Weeds are plants that are growing out of place. Insect pests include an enormous number of species from tiny thrips, that are nearly invisible to the naked eye, to the large larvae of the tomato hornworm. Diseases are caused by fungi, bacteria, viruses, and other organisms, some of which are only now being classified. Poor plant nutrition and misuse of pesticides also can cause injury to plants. Slugs, mites, and many species of wildlife such as rabbits, deer, and crows can be extremely destructive.



Identify the problem

Careful identification of the problem is essential before control practices can be used. Some insect damage may appear to be a disease, especially if no visible insects are present. Nutrient problems may also mimic diseases. Herbicide damage resulting from misapplication of chemicals also can be mistaken for other problems.

What to look for

Insects and mites

All insects have six legs, but other than that they are extremely variable. They include such organisms as beetles, flies, bees, ants, moths, and butterflies. Mites and spiders have eight legs. They are not insects. But for the purposes of

Clay Smith

this tip sheet, they will be considered as insects. Insects damage plants in several ways. The most visible damage is chewed plant leaves and flowers. Many pests are visible and can be readily identified, including the Japanese beetle, Colorado potato beetle, and numerous species of caterpillars such as tent caterpillars and tomato hornworms. Other chewing insects, however, such as cutworms (which are caterpillars) come out at night to eat, and burrow into the soil during the day. These are much harder to identify but should be considered if young plants seem to disappear overnight or are found cut off at ground level.

Sucking insects are extremely common and can be very damaging. These insects insert their mouth parts into the plant tissues and suck out the plant juices. They also may carry diseases that they spread from plant to plant as they move about the yard. You may suspect that these insects are present if you notice misshapen plant leaves or flower petals. Often the younger leaves will appear curled or puckered. Flowers developing from the buds may only partially develop. Look on the underside of the leaves as that is where many species tend to gather. Common sucking insects include leafhoppers, aphids, mealy bugs, thrips and mites.

Other insects cause damage by boring into stems, fruits, and leaves. They may disrupt the plant's ability to transport water. They also create opportunities for disease organisms to attack the plants. You may suspect the presence of boring insects if you see small accumulations of sawdust-like material on plant stems or fruits. Common examples of boring insects include squash vine borers and corn borers.

Diseases

Plant disease identification is extremely difficult. In some cases, only laboratory analysis can conclusively identify diseases. Disease organisms injure plants in several ways. Some attack leaf surfaces and limit the plant's ability to carry on photosynthesis. Other organisms produce substances that clog plant tissues that transport water and nutrients. Other disease organisms produce toxins that kill the plant or replace plant tissue with their own.

Symptoms associated with plant diseases may include the presence of mushroom-like growths on trunks of trees; leaves with a grayish mildewy appearance; spots on leaves, flowers, and fruits; sudden wilting or death of a plant or branch; sap exuding from branches or trunks of trees; and stunted growth.

Misapplication of pesticides and nutrients, air pollutants, and other environmental conditions such as flooding and freezing can also mimic some disease problems. Yellowing or reddening of leaves and stunted growth may indicate a nutritional problem. At first glance, blossom end rot of tomato, in which the bottom of the tomato turns black, might appear to be a disease caused by some pathogen. It is actually caused by the plant's inability to take up calcium quickly enough during periods of rapid growth. Prevent this problem with adequate moisture -- adding more calcium is of no benefit! Leaf curling or misshapen growth may be a result of herbicide application.

Beneficial insects, such as lady beetles, control aphids and a wide variety of other insects.

Finding a pest problem and then treating for that problem -- such as spot spraying -- is cost effective and limits any damage to non-targeted species.

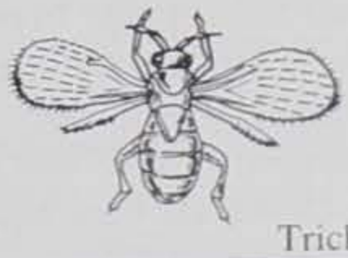
Some beneficial insects

Ground beetle

Lacewing

Ladybug

Praying mantis



Trichogramma wasp

Praying mantis with a grasshopper and house wren with an insect.

Pest management practices

Preventing pests should be your first goal. But it's unlikely you will be able to avoid all pest problems, since some plant seeds and disease organisms lay dormant in the soil for years.

Diseases need three elements to become established: the disease organism, a susceptible species and the proper environmental conditions. Some disease organisms can live in the soil for years; other organisms are carried in infected plant material that falls to the ground. Some disease organisms are carried by insects. Good sanitation will help limit some problems. Planting resistant varieties of plants prevents many diseases. Rotating annual crops in a garden also prevents some diseases.

You will likely have the most opportunity to alter the environment in favor of the plant and not the disease. Healthy, vigorous lawn and garden plants have a higher resistance to pests. Plants that have adequate, but not excessive, nutrients are better able to resist attacks from both diseases and insects. Excessive rates of nitrogen often result in extremely succulent vegetative growth and can make plants more susceptible to insect and disease problems, as well as decrease their winter hardiness. Proper watering and spacing of plants limits the spread of some diseases. Some disease species require free-standing water in which to spread, while other species just need high humidity. Proper spacing provides good aeration around plants. Trickle irrigation, where water is applied to the soil and not the plant leaves, may be helpful.

Barriers may be effective to exclude some pests. Mulching is effective against weeds. Fences can limit damage from rabbits. Row covers may prevent insect damage on young vegetable plants. Netting can be applied to small fruit trees and berries to limit damage from birds.

Integrated Pest Management (IPM)

It is difficult, if not impossible, to prevent all pest problems every year. If your best prevention efforts have not been entirely successful, you may need to use some control methods. Integrated Pest Management (IPM) relies on several techniques to keep pests at acceptable population levels without excessive use of chemical controls. The basic principles of IPM include monitoring (scouting), determining tolerable injury levels (thresholds), and applying appropriate strategies and tactics. Unlike other methods of pest control where pesticides are applied on a rigid schedule, IPM applies only those controls that are needed, when they are needed, to control pests that will cause more than a tolerable level of damage to the plant.

Monitoring is essential for a successful IPM program. Check your plants regularly. Look for signs of damage from insects and diseases as well as indications of adequate fertility and moisture. Early identification of potential problems is essential.

There are thousands of insects in the garden, many of which are harmless or even beneficial. Proper identification is needed before control strategies can be adopted. It is important to recognize the different stages of insect development for several reasons. The caterpillar eating your plants may be the larvae of the butterfly you were trying to attract. Th small larvae with six spots on its back probably the young of the ladybug, a v beneficial insect. Some control practic are most effective on young insects. Different stages may also be more damaging than others.

It is not necessary to kill every ins weed, or disease organism to have a healthy yard. This is where the concep thresholds comes in. The economic threshold is the point where the dama caused by the pest exceeds the cost of control. In a home garden, this can be difficult to determine. What you are growing and how you intend to use it determine how much damage you are willing to tolerate. Remember that lar plants, especially those close to harve can tolerate more damage than a tiny seedling. A few flea beetles on a radis seedling may warrant control whereas numerous Japanese beetles eating the leaves of beans close to harvest may n

If the threshold level for control h been exceeded, you may need to emplo control strategies. Strategies can be discussed with the Cooperative Exten Service, garden centers or nurseries.

Beneficial Insect	Controls
Green lacewings	aphids, mealy bugs, thrips, spider mites
Ladybugs	aphids, Colorado potato beetle
Praying mantis	almost any insect
Ground beetles	caterpillars that attack trees and shrubs
Parasitic nematodes	grubs, beetles, cutworms, army worms
Trichogramma wasp	corn borer, cabbage looper, other worms
Seedhead weevils	weeds

Control strategies

Mechanical/physical controls

Insects--

Many insects can be removed by hand. This method is preferable if a few, large insects are causing the problem. Simply remove the insect from the plant and drop it into a container of soapy water or vegetable oil. Caution: some insects have spines or excrete oily substances that can cause injury to humans. Use caution when handling unfamiliar insects. Wear gloves or remove insects with tweezers.

Many insects can be removed from plants by spraying water from a hose or sprayer. Small vacuums can be used to suck up insects.

Traps can be used effectively for some insects. These come in a variety of styles depending on the insect to be caught. Many traps rely on the use of pheromones--naturally occurring chemicals produced by the insects and used to attract the opposite sex during mating. They are extremely specific for each species and, therefore, will not harm beneficial species. One caution with traps is that they may actually draw more insects into your yard. You should not place them directly in the garden. Other traps are more generic and will attract numerous species. These include such things as yellow and blue sticky cards. Different insects are attracted to different colors. Sticky cards can also be used effectively to monitor insect pests.

Weeds--

Hoeing, pulling and mulching are the most effective physical control methods for weeds. Weeding is most important while plants are small. Well established plants can often tolerate competition from weeds.

Diseases--

Removal of diseased material limits the spread of some diseases. Clean up litter dropped from diseased plants. Prune diseased branches on trees and shrubs. When pruning diseased trees and shrubs, disinfect your pruners between cuts with a solution of chlorine bleach to avoid spreading the disease from plant to plant. Control insects known to spread plant diseases.

Other pests--

Fences, netting, and tree trunk guards can be extremely successful in limiting damage from small mammals and birds. Numerous traps are also available to catch or kill some animals. Traps may also catch animals other than the ones targeted. Check local regulations before trapping.

Diatomaceous earth, a powder-like dust made of tiny marine organisms called diatoms, can be used to reduce damage from soft-bodied insects and slugs. Spread this material on the soil -- it is sharp and cuts or irritates these soft organisms. It is harmless to other organisms. Shallow dishes of beer can be used to trap slugs.

Biological controls

Biological controls are nature's way of regulating populations. Biological controls rely on predators and parasites to keep organisms under control. Many of our present pest problems result from the loss of predator species.

Other biological controls include birds and bats that eat insects. A single bat can eat up to 600 mosquitoes an hour. Many bird species eat insect pests on trees and in the garden.

Bacillus thuringiensis (Bt) is a bacteria that specifically attacks larvae of some insect pests including white grubs in the lawn and Japanese beetles. This bacteria is harmless to desirable species.

Chemical controls

When using biological controls, be very careful with pesticides. Most common pesticides are broad spectrum in that they kill a wide variety of organisms. Spray applications of insecticides are likely to kill numerous beneficial insects as well as the pests. Herbicides applied to weed species may drift in the wind or vaporize in the heat of the day and injure non-targeted plants. Runoff of pesticides can pollute water. Many pesticides are toxic to humans as well as pets and small animals that may enter your yard.

Some common, non-toxic household substances are as effective as many more toxic compounds. A few drops of dishwashing detergent mixed with water and sprayed on plants is extremely effective in controlling many soft-bodied insects such as aphids and whiteflies. Crushed garlic mixed with water may control certain insects. A baking soda solution has been shown to help control some fungal diseases on roses.

When using pesticides, follow label directions carefully. Altering the rate of application or increasing the frequency of application can injure desirable plant and

animal species. Spot applications of the pesticide to the targeted pest can reduce the amount used and help reduce the risk of injury to non-targeted species. Do not apply on windy days. Read the label for information on other environmental conditions such as temperature and rain that may influence the pesticide's effectiveness. Be aware that many so-called "organic" pesticides may be just as toxic as the synthetic or chemical products.

Scouting a farm field for pests

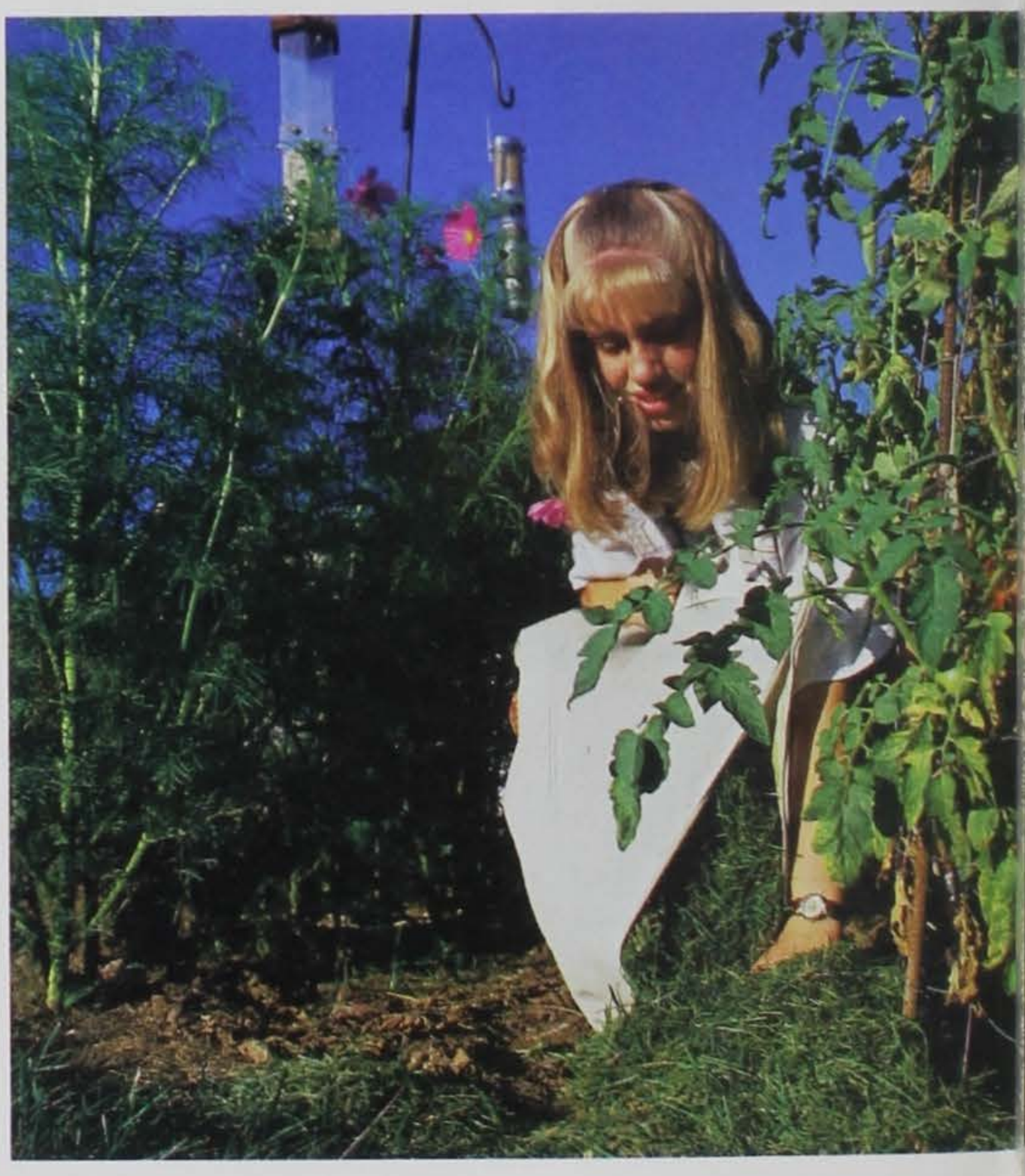
On the farm

Proper pest management on the farm involves a variety of practices, such as rotating crops to reduce disease and insect problems, and establishing tall grass hedges to provide habitat for beneficial insects. Many farmers now monitor their fields regularly -- a practice called scouting -- to keep track of insect and weed populations. Only when populations reach a level where an unacceptable amount of damage is likely are direct control measures initiated. When pesticides are necessary, farmers fill and clean tanks away from water sources, mix only necessary amounts, and apply only to land where problems exist.

Many farmers are using IPM techniques for effective and economic control of pests. Based on monitoring of specific pests, farmers apply only those pesticides needed for adequate control.

Mulching

Mulching enriches and protects soil, helping provide a better growing environment.



In your backyard

Mulching is one of the simplest and most beneficial practices you can use in the garden. Mulch is simply a protective layer of a material that is spread on top of the soil. Mulches can either be organic -- such as grass clippings, straw, bark chips, and similar materials -- or inorganic -- such as stones, brick chips, and plastic. Both organic and inorganic mulches have numerous benefits.

Mulch:

- protects the soil from erosion
- reduces compaction from the impact of heavy rains
- conserves moisture, reducing the ne for frequent waterings
- maintains a more even soil temperat
- prevents weed growth
- keeps fruits and vegetables clean
- keeps feet clean, allowing access to garden even when damp
- provides a "finished" look to the gar

Organic mulches also improve th condition of the soil. As these mulche slowly decompose, they provide orgar matter which helps keep the soil loos This improves root growth, increases infiltration of water, and also improv

the water-holding capacity of the soil. Organic matter is a source of plant nutrients and provides an ideal environment for earthworms and other beneficial soil organisms.

While inorganic mulches have their place in certain landscapes, they lack the soil improving properties of organic mulches. Inorganic mulches, because of their permanence, may be difficult to remove if you decide to change your garden plans at a later date. Therefore, this tip sheet is limited to the use of organic mulches.

Mulch materials

You can find mulch materials in your own yard! Lawn clippings make excellent mulch. While not particularly attractive for a flower bed, they work wonderfully in the vegetable garden. The fine texture allows them to be spread easily even around small plants. However, grass clippings are becoming scarce because of the increased popularity of mulching lawnmowers that provide many of the same benefits of mulching to lawns.

Newspaper, as a mulch, works especially well to control weeds.

Leaves are another readily available material to use as mulch. Leaf mold, or the decomposed remains of leaves, gives the forest floor its absorbent spongy structure.

Compost makes a wonderful mulch if you have a large supply. Compost not only improves the soil structure but provides an excellent source of plant nutrients.

Bark chips and composted bark mulch are available at garden centers. These make a neat finish to the garden bed and will eventually improve the condition of the soil. These may last for one to three years or more depending on the size of the chips or how well composed the bark mulch is. Smaller chips tend to be easier to spread, especially around small plants. Depending on where you live, numerous other materials make excellent mulches. Hay and straw work well in the vegetable garden, although they may harbor weed seeds. Ground corn cobs and pine needles can also be used. Pine needles tend to increase the acidity of the soil so they work best around acid-loving plants such as rhododendrons and blueberries.

Bark mulch -- Smaller chips are easier to spread, especially around small plants. Excellent for use around trees, shrubs, and perennial gardens. When spreading mulch around trees, keep the mulch an inch or two away from the trunk. A couple inches of mulch is adequate. There is no need to apply the mulch 6 or 8 inches high, as often is seen. **Amount to apply -- 2-4 inches.**

Wood chips -- Similar to bark mulch. If using fresh wood chips that are mixed with a lot of leaves, composting may be beneficial. **Amount to apply -- 2-4 inches.**

Leaves -- Best to chop and compost before spreading. If using dry leaves, apply about six inches deep. **Amount to apply -- 3-4 inches.**

Grass clippings -- Thicker layers tend to compact and rot, becoming quite slimy and smelly. Add additional layers as clippings decompose. Do not use clippings from lawns treated with herbicides. **Amount to apply -- 2-3 inches.**

Newspaper -- Apply sheets of newspaper and cover lightly with grass clippings or other mulch material to anchor. If other mulch materials are not available cover edges of paper with soil. Applying on a windy day can be a problem. **Amount to apply -- 1/4 inch.**

Compost -- Excellent material for enriching soil. **Amount to apply -- 3-4 inches.**

When to apply mulch

Time of application depends on what you hope to achieve by mulching. Mulches, by providing an insulating barrier between the soil and the air, moderate the soil temperature. This means that a mulched soil in the summer will be cooler than an adjacent unmulched soil; while in the winter, the mulched soil may not freeze as deeply. However, since mulch acts as an insulating layer, mulched soils tend to warm up more slowly in the spring and cool down more slowly in the fall than unmulched soils.

If you are using mulches in your vegetable garden or flower garden, it is best to apply them after the soil has warmed up in the spring. Cool, wet soils tend to slow seed germination

and increase the decay of seeds and seedlings.

If adding additional layers of mulch to existing perennial beds, wait until the soil has warmed completely.

Mulches used to help moderate winter temperatures can be applied late in the fall after the ground has frozen but before the coldest temperatures arrive. Applying mulches before the ground has frozen may attract rodents looking for a warm over-wintering site. Delayed applications of mulch should prevent this problem as, hopefully, the creatures would already have found some other place to nest!

Mulches used to protect plants over winter should be loose material such as straw, hay or pine boughs that will help insulate the plants without compacting under the weight of snow and ice. One of the benefits from winter applications of mulch is the reduction in the freezing and thawing of the soil in the late winter and early spring. These repeated cycles of freezing at night and then thawing in the warmth of the sun cause many small or shallow-rooted plants to be heaved out of the soil. This leaves their root systems exposed and results in injury or death. Mulching helps prevent rapid fluctuations in soil temperature and reduces the chances of heaving.

Applying mulch

Begin by asking yourself the following questions.

- What do I hope to achieve by mulching?

  Weed control?

  Moisture retention?

  Soil improvement?

  Beautification?

- How large is the area to be mulched?

- How much mulch will I need to cover the area?

Mulch is measured in cubic feet. As an example, if you have an area 10 feet by 10 feet and you wish to apply 3 inches of mulch, you would need 25 cubic feet.

(10' x 10' x .25' = 25 cu. ft.)

Determine what mulch material to use and purchase or accumulate what you need.

- Mulch can often be purchased bagged or bulk from garden centers. Bulk may be cheaper if you need large volumes and have a way to haul it. Bagged mulch is often easier to handle, especially for smaller projects. Most bagged mulch comes in 3-cubic feet bags.

- Compost--

Refer to the tip sheet on composting for information on how to make your own compost.

- Leaves--

-- Collect leaves in the fall.

-- Chop with a lawnmower or shredder. Whole leaves tend to compact if wet or blow away if dry. Chopping will reduce the volume and facilitate composting.

-- Compost leaves over winter. Some studies have indicated that freshly chopped leaves may inhibit the growth of certain crops. Therefore, it may be advisable to compost the leaves over winter before spreading them.

- Grass clippings?

-- Spread them immediately to avoid heating and rotting.

- Newspaper?

-- Save your own newspapers.

-- Use only newspaper text pages (black ink); color dyes may be harmful to soil microflora and fauna if composted and used.

-- Use 3 or 4 sheets together, anchored with grass clippings or other mulch material to prevent blowing away.

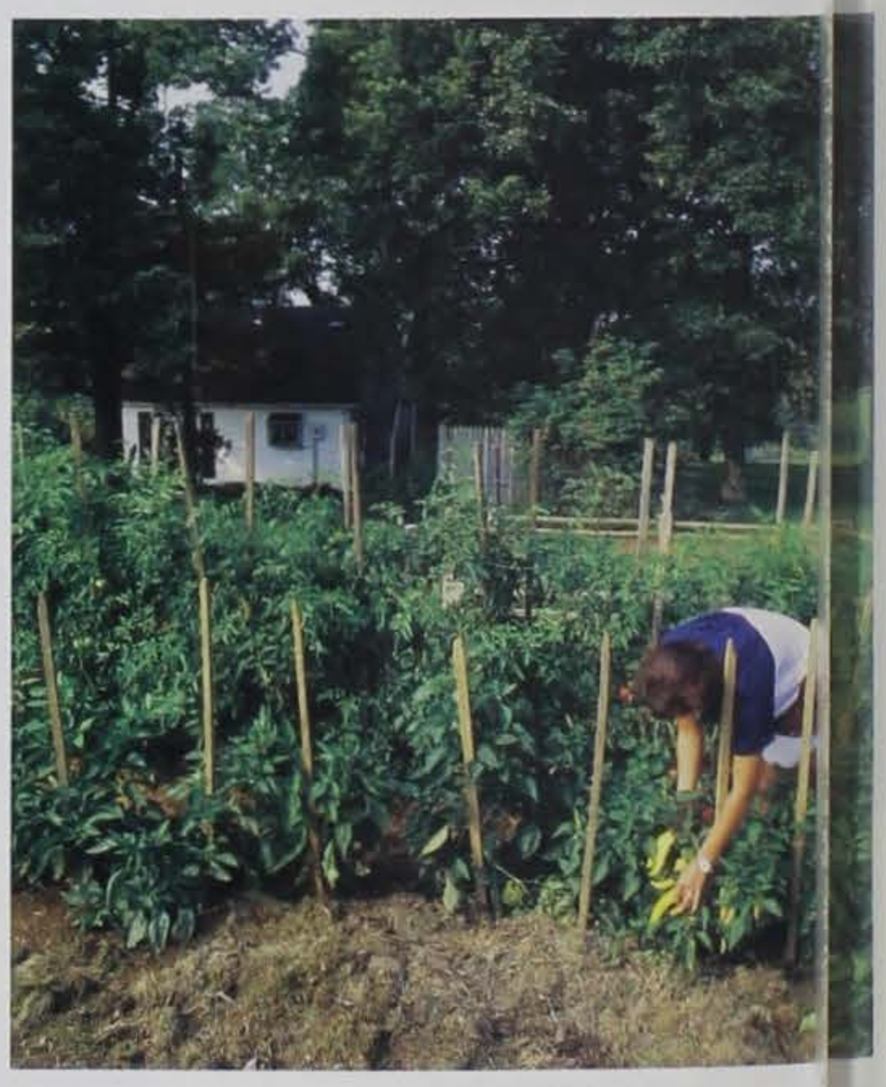
The amount of mulch to apply will be determined by the mulch material you are using.

General Guidelines:

- Do not apply mulch directly contact with plants. Leave an inch o of space next to plants to help preve diseases flourishing from excessive humidity.

- Remove weeds before spread mulch.

Bark mulch and wood chips ar sometimes used with landscape fab or plastic. The fabric or plastic is laid top of the soil and then covered with a l of bark chips. A caution to this prac while the plastic or fabric may initi provide additional protection again weeds, as the mulch breaks down, w will start to grow in the mulch itsel The barrier between the soil and the mu also prevents any improvement in t soil condition and makes planting addit al plants more difficult.



Mulching works in gardens, arou trees and shrubs and in other are

For sources of mulch

Check under mulches or garde centers or nurseries in the Yellow P es. Your local community may also ha wood chips from the removal of str trees that are available free to resid s.

Nutrient Management

Apply only the nutrients plants can use.

On the farm

Farmers use mulches in many ways. Conservation tillage is a common practice that creates a mulch on the soil surface. Unlike the once common practice of plowing all crop residue into the soil, conservation tillage leaves the crop residue on top of the soil. These pieces of corn stalk, straw or bean stems help protect the soil against wind and water erosion. Corn crops harvested for grain return large amounts of residue to the soil surface and are more effective in preventing soil erosion than crops with less residue such as soybeans.

Mulching is a common practice among strawberry growers in northern climates. In this situation, mulch is used to protect the crop during the winter and to help prevent early blooming of the plants. Plants that bloom too early are more likely to be damaged by spring frosts. The mulch also helps keep the berries cleaner, protecting them from soil splashing on them in the rain.

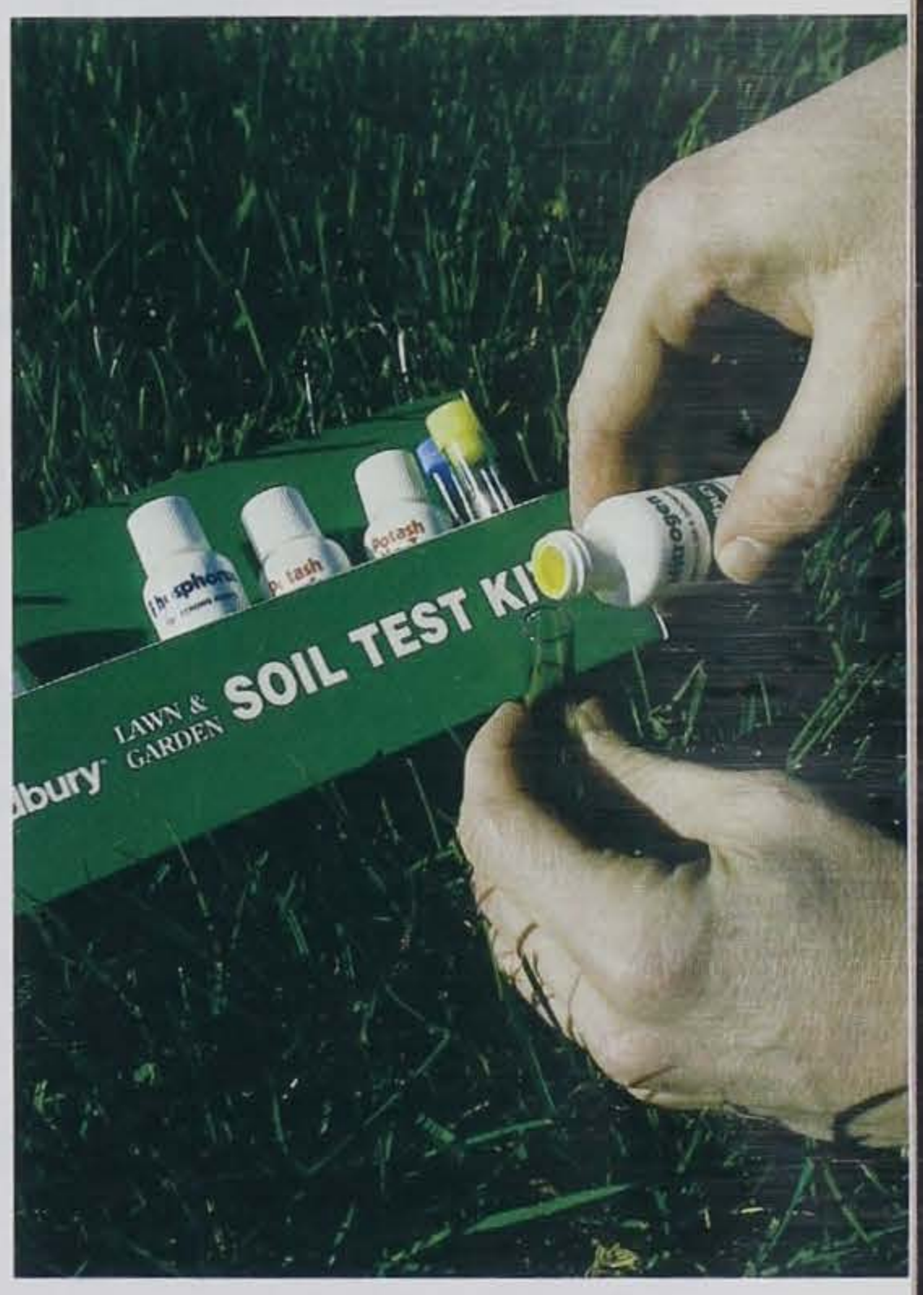
Inorganic mulches are also widely used in commercial agriculture. Clear plastic mulch can be particularly beneficial in giving warm season crops a head start. The clear plastic acts as a mini-greenhouse, warming the soil underneath it. Particularly where early sweet corn brings a premium price, this practice can give a grower a couple of weeks head start.

Also, research is showing that leaving crop residues helps hold carbon in the soil and aids in reducing greenhouse gases.

In your backyard

Twenty nutrients have been identified that are required by plants. Of these, nitrogen, phosphorus and potassium are required in relatively large amounts. Nitrogen is associated with lush vegetative growth, adequate phosphorus is required for flowering and fruiting, and potassium is necessary for durability and disease resistance. Calcium, sulfur and magnesium are also required in comparatively large quantities. These six nutrients are referred to as macronutrients.

The other nutrients, referred to as micronutrients, are required in very small amounts. These include such elements as copper, zinc, iron and boron. While both macro and micronutrients are required for good plant growth, over-application can be as detrimental as a deficiency. Over-application of plant nutrients not only may impair plant growth, but may contaminate groundwater by leaching through the soil or pollute surface waters by washing away.



Soil testing is key to applying the correct amount and kind of nutrients.

Soil testing

Testing your soil for nutrients and pH is important to provide your plants with the proper balance of nutrients while avoiding over-application. If you are establishing a new lawn or landscaping, a soil test is strongly recommended. The cost of soil testing is minor in comparison to the cost of plant materials and labor. Correcting a problem before planting is much simpler and cheaper than afterwards.

Once your yard is established, continue to take periodic soil samples. While many people routinely lime their lawns, this can result in raising the pH too high. However, since many fertilizers tend to lower the pH, the pH may drop below desirable levels after several years, depending on fertilization and other soil factors.

Home tests for pH, nitrogen, phosphorus and potassium are available from garden centers. While these may give you a general idea of the nutrients in your soil, they are not as reliable as tests performed by the Cooperative

Extension Service at land grant universities. University and other commercial testing services will provide more detail and you can request special tests for micronutrients if you suspect a problem. In addition to the analysis of nutrients in your soil, they often provide recommendations for the application of nutrients or on adjusting the pH.

The test for soil pH is very simple? The pH is a measure of how acidic or alkaline your soil is. A pH of 7 is considered neutral.

Below 7 is acidic and above 7 is alkaline. Since pH greatly influences plant nutrients, adjusting the pH will often correct a nutrient problem. At a high pH, several of the micronutrients become less available for plant uptake. Iron deficiency is a common problem even at a neutral pH on such plants as rhododendrons and blueberries. At very low pH, other micronutrients may be too available, resulting in a plant toxicity.

Phosphorus and potassium are tested regularly by commercial testing labs. While there are soil tests for nitrogen, these may be less reliable. Nitrogen is present in the soil in several forms and the forms can change rapidly. Therefore, a precise analysis of nitrogen is more difficult to obtain. Most university soil test labs do not routinely test for nitrogen. Home testing kits often contain a test for nitrogen which may give you a general idea of the presence of nitrogen, but again, due to the various transformations of nitrogen, the reading may not be reliable.

Organic matter is often part of a soil test. Soil organic matter is highly desirable. Organic matter has a large influence on soil structure. Good soil structure improves aeration and water movement and retention. This encourages increased microbial activity and root growth, both of which influence the availability of nutrients for plant growth. Soil organic matter also affects the availability of plant nutrients and how pesticides react in the soil. Soils high in organic matter tend to have a greater supply of plant nutrients compared to many soils low in organic matter.

It's a good idea to test your soil before applying nutrients to be sure you are not overapplying and loading nutrients into lakes or streams.

Organic matter tends to bind up some soil pesticides, reducing their effectiveness.

Tests for micronutrients are usually not performed unless there is reason to suspect a problem. Certain plants have greater requirements for specific micronutrients and may show deficiency symptoms. Iron deficiency is common on blueberries, rhododendrons, and pin oaks unless the soil is quite acidic. On these plants, the younger leaves will usually show signs of the deficiency first. The areas between the veins will be yellowish while the veins remain green. Other plants growing in the same soil will show no signs of a deficiency. In this case, altering the pH will often correct the problem.

Taking a soil test

Contact the local Cooperative Extension Service for information and sample bags. If you intend to send your sample to a private testing lab, contact them for specific details about submitting a sample.

Follow the directions carefully for submitting the sample. The following are general guidelines for taking a soil sample.

- Sample when the soil is moist but not wet.
- For each acre of land to be tested, 10 to 15 sub-samples are recommended. Areas that appear different or that have been used differently should be sampled separately. For example, a separate sample should be submitted for an area that has been in a garden and one that has been lawn.
- Obtain a clean pail or similar container.
- Clear away the surface litter or grass.
- With a spade or soil auger, dig a small amount of soil to a depth of 6 inches.
- Place the soil in the clean pail.
- Repeat the last three steps until

the required number of samples have been collected.

- Mix the samples together thoroughly.
- From the mixture, take the sample that will be sent for analysis.
- Send immediately. Do not dry before sending.

If you are using a home soil testing kit, follow the above steps for taking your sample. Follow the directions in the test kit carefully.

Fertilizers and soil amendments

Once you have the results of the soil test, you can add nutrients or soil amendments such as lime, as needed. If you need to raise the pH, use lime. Lime is most effective when it is mixed into the soil, therefore it is best to apply before planting. For large areas, rototilling is most effective. For small areas or around plants, working the lime into the soil with a spade or cultivator is preferable. When working around plants, be careful not to dig too deeply or so roughly that you damage plant roots. Depending on the form of lime and the soil conditions, the change in pH may be gradual. It may take several months before a significant change is noted. Soils high in organic matter and clay tend to take larger amounts of lime to change the pH than do sandy soils.

If you need to lower the pH significantly, especially for plants such as rhododendrons, you can use aluminum sulfate. Other commercially available fertilizers will also help lower the pH. In all cases, follow the soil test or manufacturer's recommended rates of application. Again, mixing well into the soil is recommended.

There are numerous choices for providing nitrogen, phosphorus and potassium. If your soil is of adequate fertility, applying compost may be the best method of applying additional nutrients. While compost is relatively low in nutrients compared to commercial fertilizers, it is especially beneficial in improving the condition of the soil. By keeping the soil loose, compost allows plant roots to grow well throughout the soil, allowing them to extract nutrients from a larger area. A loose soil enriched with compost is also an excellent habitat for earthworms and other beneficial soil microorganisms that are essential for releasing nutrients for plant use. The nutrients from compost are also released slowly so there is no concern for "burning" the plant with an over-application.

Manure is also an excellent source of plant nutrients and organic matter. Manure should be composted before applying. Fresh manure may be too strong and can injure plants. Be careful when composting manure. If left in the open, exposed to rain, nutrients may leach out of the manure and the runoff can contaminate waterways. Make sure the manure is stored in a location away from wells and any waterways, and that any runoff is confined or slowly released into a vegetated area. Improperly applied manure also can be a source of pollution. For best results, work composted manure into the soil. If preparing a bed before planting, compost and manure may be worked into the soil to a depth of 8 to 12 inches. If adding to existing plants, work carefully around plants.

Green manures are another source of organic matter and plant nutrients.

Green manures are crops that are grown and then tilled into the soil. As they break down, nitrogen and other plant nutrients become available. Green manures may also provide additional benefits of reducing soil erosion. Green manures such as rye and oats are often planted in the fall after the crops have been harvested. In the spring, these are tilled under before planting.

With all organic sources of nitrogen, whether compost or manure, the nitrogen must be changed to an inorganic form before the plants can use it. Therefore, it is important to have well-drained, aerated soils that provide the favorable habitat for the soil microorganisms responsible for these conversions.

There are numerous sources of commercial fertilizers that supply nitrogen, phosphorus and potassium. The first number on the fertilizer analysis is the percentage of nitrogen, the second number is phosphorus and the third number is the potassium content. A fertilizer like 10-20-10 has twice as much of each of the nutrients as a 5-10-5. How much of each nutrient you need depends on your soil test results and the plants you are fertilizing. As was mentioned before, nitrogen stimulates vegetative growth while phosphorus stimulates flowering. Too much nitrogen can inhibit flowering and fruit production. For many flowers and vegetables, a fertilizer higher in phosphorus than nitrogen is preferred such as a 5-10-5. For lawns, nitrogen is required in greater amounts so a fertilizer with a greater amount of nitrogen is beneficial.

Fertilizer application

Commercial fertilizers are normally applied as a dry granular material, or mixed with water and watered onto the garden. If using granular materials, avoid spilling on sidewalks and driveways. These materials are water soluble and can cause pollution problems if rinsed into storm sewers. Granular fertilizers are a type of salt, and if applied too heavily on plants, they can burn the plants. If using a liquid fertilizer, apply directly to or around the base of the plant.

For the most efficient use and to decrease the potential for pollution, fertilizer should be applied when the plants have the greatest need for the nutrients. Plants that are not actively growing do not have a high requirement for nutrients. Therefore, applications of nutrients to dormant plants, or plants growing slowly due to cool temperatures, are more likely to be wasted.

Testing soil on the farm

While light applications of nitrogen may be recommended for lawns in the fall, generally, nitrogen fertilizers should not be applied to most plants in the fall in regions of the country that experience cold winters. Since nitrogen encourages vegetative growth, if it is applied in the fall it may reduce the plant's ability to harden for winter.

In some gardens, fertilizer use can be reduced by applying it around the individual plants rather than broadcasting across the entire garden. In the case of phosphorus, much of the fertilizer phosphorus becomes unavailable to the plants once spread on the soil. For better plant uptake, apply the fertilizer in a band near the plant. Do not apply directly to the plant or in contact with the roots.

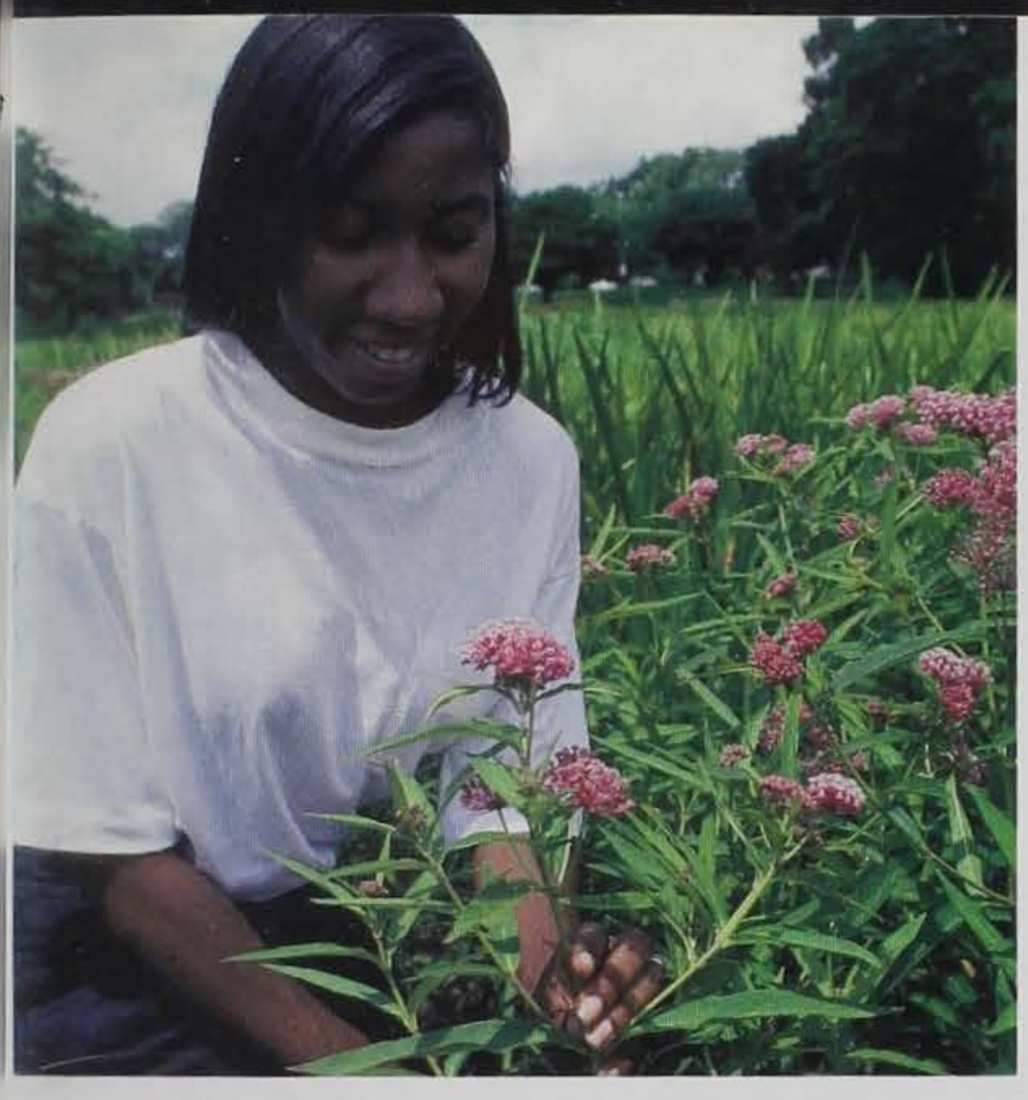
On the farm

Farmers routinely test their soil to determine the nutrient status. Fo both ecological and economic reasons, the farmer does not want apply any more than is needed for healthy crop development. Based o soil test results from across their fields, farmers can vary the rate of application depending on soil condi tions. Precision application of fertilizer is becoming more commor as global positioning technology develops. Global positioning uses satelli technology to help the farmer apply the prope amount of fertilizer based on the soil tests results when traveling across the field.

The late spring tes for soil nitrate allows many corn growers to reduce the amount of nitrogen they apply to their cornfields. Farme sample their fields when the corn is about 6 inches tall, and apply only the amount of nitrogen needed for crop growth.

Farmers apply a variety of fertilizer materials. Manure is recog nized as an excellent source of plai nutrients as well as a source of organic matter. Farmers with acces to livestock manure often find that manure alone can meet the nutrien needs of their crops. Commercial sources of nitrogen are commonly applied by farmers with limited access to manure. One source of nitrogen that many farmers use is anhydrous ammonia. This gaseous form of nitrogen is "knifed" into the soil between the rows, placing the fertilizer where it can readily be use by the plant roots.

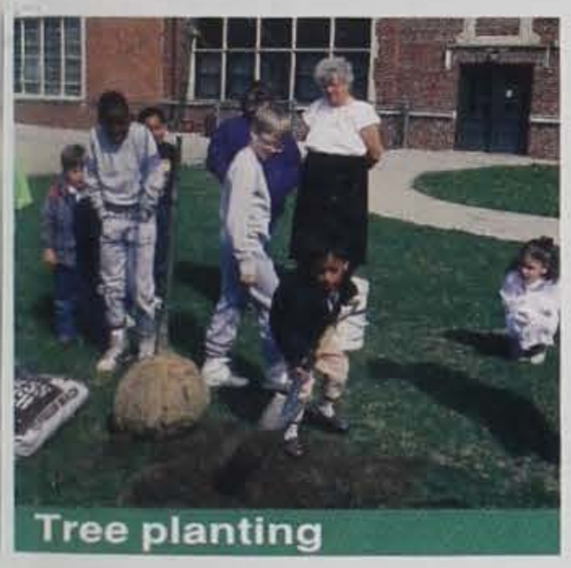
Green manure crops and crop rotations involving legumes also provide farmers with an additional source of plant nutrients.



Everybody has a backyard

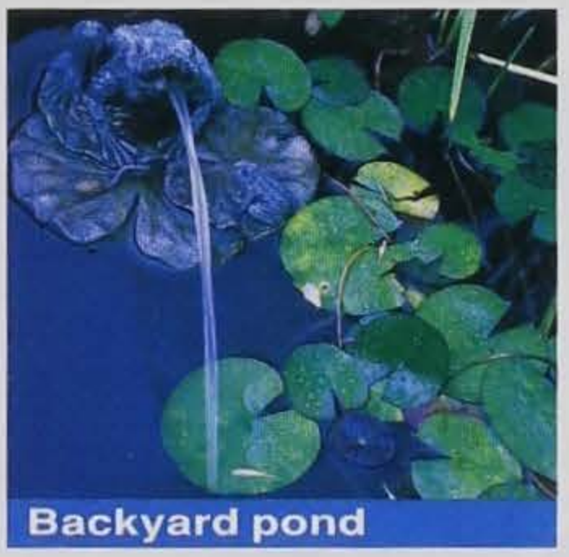
Even if you don't have a backyard of your own, there are many opportunities to use conservation practices to contribute to a healthy environment. Backyard ponds, wetlands, native grass plantings and plants that attract wildlife can improve school grounds, areas around apartments and businesses, community gardens, parks and other areas.

Additional tip sheets on the subjects below and a colorful 28-page booklet on Backyard Conservation are available free by calling 1-888-LANDCARE (single copies only), as well as on the Web at www.nrcs.usda.gov/



Tree planting

Wildlife habitat



Backyard pond

Backyard wetland

Composting

Terracing

Water conservation

Backyard Conservation is a cooperative project of:
USDA Natural Resources Conservation Service
National Association of Conservation Districts
Wildlife Habitat Council

Reprinted with permission from the Spring 1999 Pheasants Forever Journal.

ROGER HILL

By the 1950s, in a little over a century, European man with his plow and gun finally drove the last greater prairie chicken from Iowa, in what was the heart of its historic range. The fascinating, but ultimately glutinous account of "The Last Chicken Hunt" (please see page 19) from 1870s Iowa speaks in stark contrast to the determined efforts of today's landowners, wildlife professionals and Pheasants Forever members to re-establish this grand upland gamebird.

A Prairie Voice Restored

JOHN NEWTON

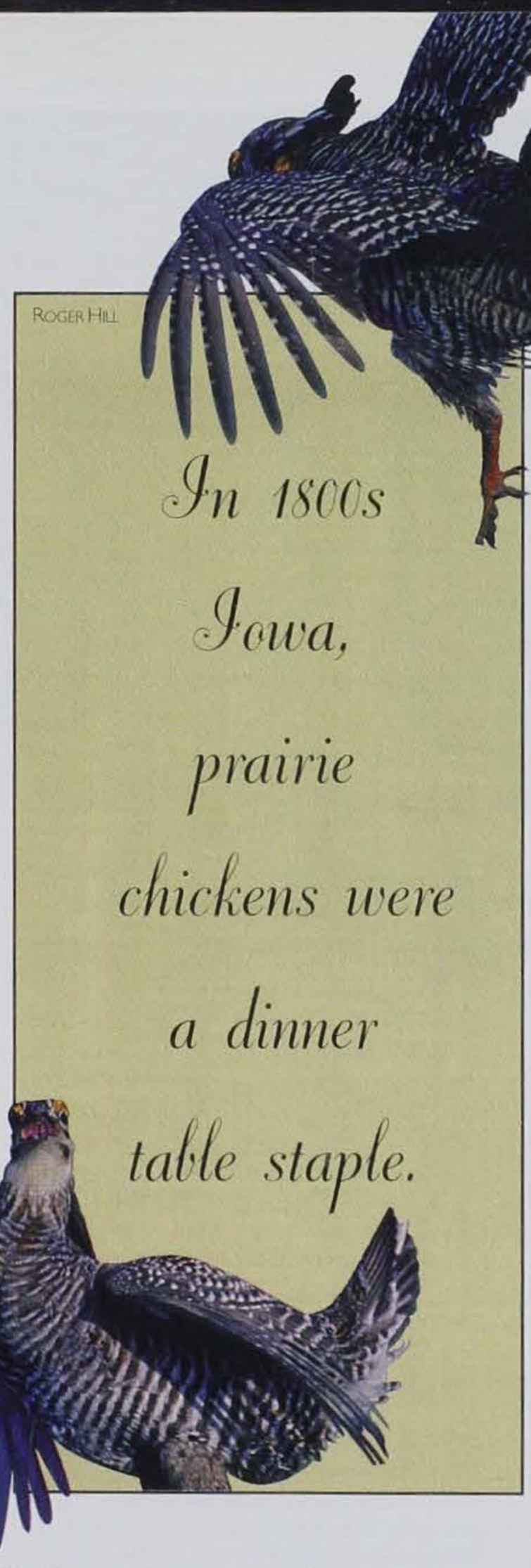
If the ceaseless prairie wind were to suddenly stop and all the days thereafter fell weirdly still, surely those who listen would cast a worried gaze skyward and wonder why. Was it thus one spring morning in drought-ridden southern Iowa when, in the early 1950s, the glad booming of courting prairie chickens failed to cry greeting to the rising sun? Did Iowa's last chicken freeze still, alone in a January blizzard? Was the last bird a meal for a sharp-eyed red tail? Or did the lonely survivor simply fly south to flocks still hanging on in nearby Missouri? No one knows the fate of Iowa's last native-born chicken.

After this anonymous demise, did anyone notice when not a chicken — birds that once called Iowa their unquestioned stronghold among all the prairies — flew low, but with great determination to its courtship dancing area, or lek, to renew a life giving cycle that had reigned unbroken for thousands of years?

Perhaps a farmer that had lived for years near a once booming lek noticed the silence. Did he step outside his dairy barn for a break from milking one early March morning, when the chickens' dancing and booming usually commenced, and wonder why nothing but the cawing of crows rose from his shortgrass pasture? Was there a pang of sadness at the loss? Perhaps a red fox in search of a meal took note. Surely a renard had an old dancing ground in its territory he visited each spring. But during that strangely silent spring, upon stalking close one morning to peer through the brush, the only dancing he would have seen was a tepid tango between breeze and bluegrass.

Maybe no one noticed the chicken's passing — save the land.

BY MARK. HERWIG



Surely the land took note of the hundreds and thousands of its missing brood that once stamped out their fervent dance atop her firm prairie sod. The disappearance would last some 30 years, rendering Iowa the only midwestern state in the chickens' historic range with nary a bird.

Turning back the clock

When the spring of 1980 dawned, however, the Iowa Conservation Commission (now Department of Natural Resources, DNR) was poised to heal the wound. That spring, the DNR released 53 Kansas prairie chickens near the city of Onawa in west central Iowa. (Pheasants Forever Senior Wildlife Biologist Jim Wooley, who is still stationed Iowa, helped manage the 1980 chicken release when he worked for the Iowa DNR).

None of the 1980 birds survived, but the state did not give up on returning its native son back home. In 1987, in south central Iowa's Ringgold County, near where the last nesting chicken was seen in Appanoose County 1952, more birds were released. This time, the reunion took, and in one, later chance meeting, quite humorously.

The spring of 1992, a farmer reported a lone chicken-like bird that showed up each morning to "court" a diesel tractor on his Adair County farm. Adair lies between Ringgold County to the south and Boone County to the north, the scene of the accompanying article "The Last Chicken Hunt."

Kevin Blazek, Adair County Pheasants Forever Habitat Committee and county conservation board director, told the tale: "This farmer came to my office and asked me to come out and identify a strange bird that had a real fondness for his diesel tractor. It was breeding season and this one male bird seemed attracted to the puttering sound of the engine. I went to the farm, got a bird book out, flipped through the pages and there it was — a prairie chicken."

Most the Ringgold chickens later abandoned Iowa for Missouri, but at least they survived there. Once again, however, in 1993 birds were released into Iowa's Ringgold and Adair counties, and this time the birds took a liking to their long vacant haunts. Over the years, some 500 chickens have been released into Iowa. Today, the Iowa DNR now regards its prairie chicken population as "small, but somewhat stable ... across a wide area of southern Iowa."

Blazek credits Ringgold County Chapter member Mel Moe for leading the charge to restore the prairie chicken to Iowa. "If it hadn't been for Moe, restoration wouldn't have happened in Iowa at all," he said in gratitude.

Moe, who is also manager of the Mt. Ayr Wildlife Unit, Iowa DNR, said the successful 1987 effort to re-establish the prairie chicken actually started two years earlier with the 1985 authorization of the federal Conservation Reserve Program (CRP), legislation supported by the then fledgling Pheasants Forever.

Pheasants Forever weighs in

Since then, Moe said, "Pheasants Forever has been our best private sector supporter of the prairie chicken. The birding groups haven't come through. Pheasants Forever has helped make the new Kellerton project possible, basically, through financial donations. We had to get the land bought before anything else, such as habitat restoration, could happen."

The Kellerton project, located in Ringgold County, consists of 10,000 acres of "pretty good grassland," 2,000 of which the state hopes to purchase from willing sellers. Permission to attempt to purchase Kellerton land was just approved by the Iowa DNR in November 1998. And stepping up to the table with some cash for the purchase is the local Pheasants Forever chapter.

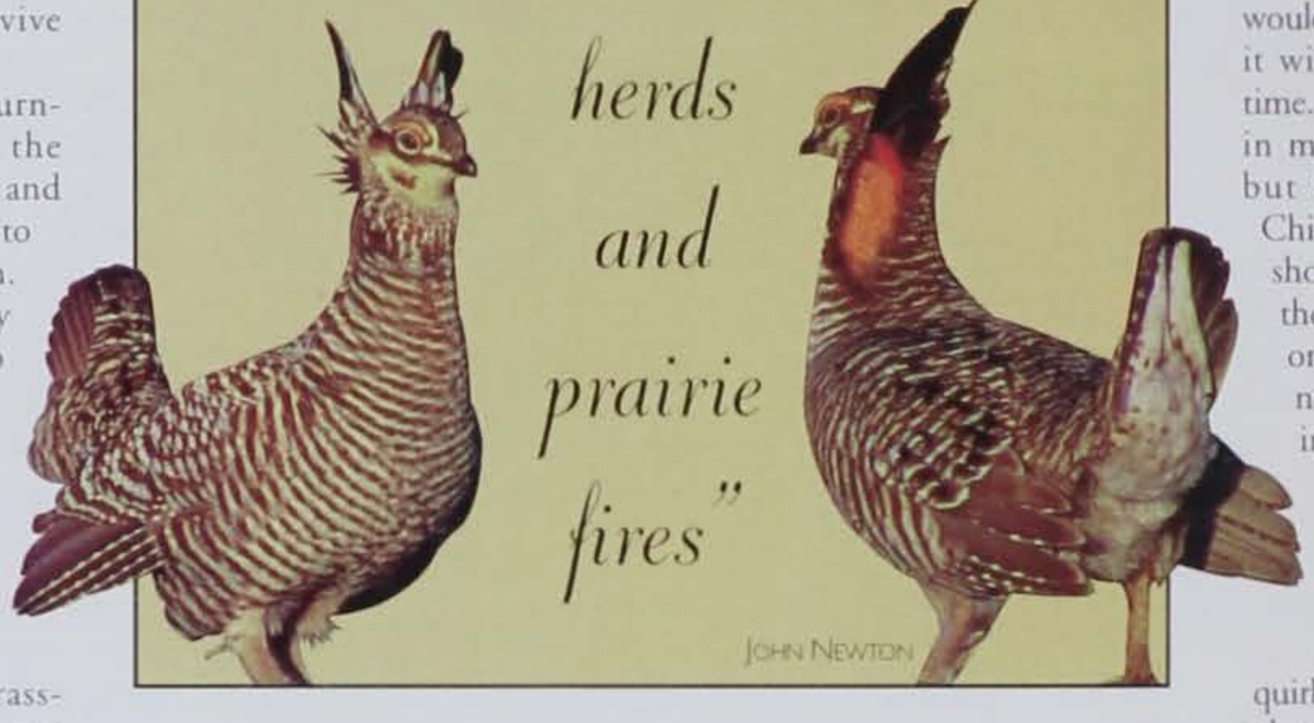
John Newton, Ringgold County Chapter secretary, said the chapter has committed $7,000 towards the purchase of Kellerton project land and "possibly more if the spring 1999 banquet goes well. It's important we have some state-owned land for the future to keep public hunting alive. Many people can't afford to shell out extra money to hunt, and Kellerton provides some good habitat for pheasants as well as prairie chickens." Adair County Chapter members have also volunteered their time to help with chicken restoration efforts and helped finance Kansas bird capture and release programs in 1993 and 1994.

But once the chickens are rounded up, certain habitat needs must be met for them to survive. Prairie chickens need short grasslands and open horizons to help keep a sharp eye out for avian predators such as red-tailed hawks. "Chickens aren't well adapted to escaping predators that attack from a perch. But in open ground, the chickens readily identify hawks and fly away. The grass can't be too tall, though, because the chickens have to

be able to get their heads over it to see their enemies coming," Moe said. Chicks need insects in spring and adults wild plant or domestic grain seeds to survive come winter.

Some controlled burning may be used on the new chicken grounds and properly timed haying to avoid nest destruction. "Limited grazing" may also be employed to keep the grass short, Moe said. Cattle now do the grazing, but there was a time in Iowa when a more prehistoric creature did the job.

> *"Prairie chicken leks moved with the bison herds and prairie fires"*



JOHN NEWTON

The open, short grasslands chickens prefer are exactly what a grazing herd of bison would have left in its wake over a century ago in frontier Iowa. "Prairie chicken leks moved with the bison herds and prairie fires because they kept the grass short. Later, the chickens followed the settlers as they plowed, farmed and grew grain — it was an instant response from what I've read," Moe said.

While there are no wild buffalo roaming Ringgold County these days, Moe said there is a small herd at the new, 2,000 acre Walnut Creek National Wildlife Refuge just southeast of Des Moines, Iowa. Refuge management, which may eventually purchase 6,000 more acres of prairie, should consider introducing the chicken and restoring the ancient partnership between bison and bird, he said.

The next chicken hunt?

Don't load up your smooth bores just yet. "Maybe CRP will increase some day (Adair County is down to 14,000 acres from 28,000 in 1995 — typical for Iowa), and we could have a lot of them. Iowa was once all grass, and we've done an awful good job of getting rid of just about all of it. But, we're doing a good job now of getting some of it back. Where the prairie chicken is surviving, we now have northern harrier hawks, short eared owls, sedge wrens, bobolinks, upland sandpipers — in a word, all the prairie birds that had disappeared," Moe reported.

Newton cut to the quick. "A huntable population would be great, but I doubt it will happen in my lifetime. I could see it, maybe, in my childrens' lifetime, but it depends on CRP. Chickens need big areas of short grass. Maybe down the road. It also depends on farming practices. For now, it's just fun knowing some are back," he said.

Since working to restore the prairie chicken, Newton has grown fond of this quirky bird, and has invested considerable time and money to observe and photograph them during their unique spring dancing and booming rituals. "I've had them land on my blind even! It gives them a better view of the goings on at the lek. And if the wind's blowing and its chilly, I've had them nestle up to the blind to keep warm," he recalled.

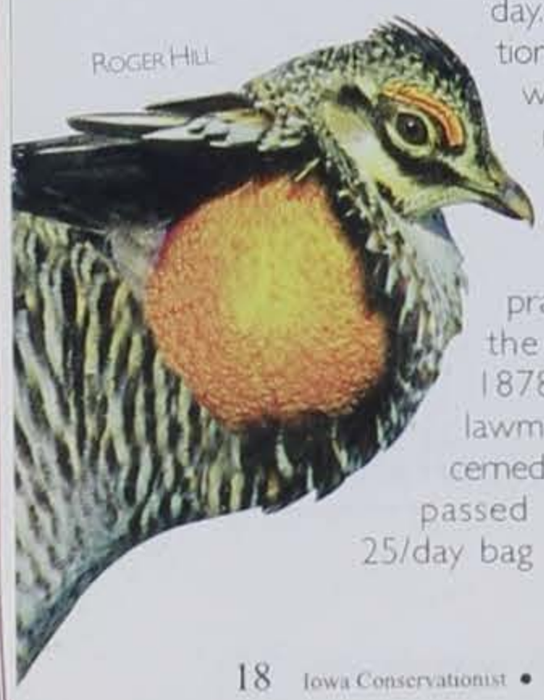
People are noticing, this time, that the prairie chicken has come back to Iowa. And if they were to ever disappear again, we wouldn't have to imagine for long who would be among the first to mourn their passing.

Herwig is editor of Pheasants Forever Journal.

1878 Chicken Law was First Bag Limit

In 1800s Iowa, prairie chickens were a dinner table staple. Daily bags of 25 and even 50 were common, and some "hunters" took up to 200 a day. Chicken populations peaked in 1880 when Iowa was a mosaic of small grain and hay fields, pasture and native prairie, according to the Iowa DNR. By 1878, however, Iowa lawmakers were concerned about overkill and passed a law setting a 25/day bag limit — marking what is believed to be the first time in the nation's history a bag limit was used to regulate game harvest. Habitat destruction eventually reduced prairie chicken numbers to a remnant, and the hunting season was closed in 1916.

ROGER HILL



Spy a Chicken — Call

Iowa prairie chickens fixed with electronic tracking beacons have been located 40 miles from their release site. One bird banded in Missouri was found dead 60 miles from its home site. Researchers credit the bird's wanderlust to its habit of following wandering bison herds and prairie fires in search of better feed, good nesting habitat and new leks. This same survival instinct has also made it difficult for conservationists trying to re-establish the prairie chicken in Iowa to locate new leks and undertake efforts to protect and improve habitat near these important breeding and nesting sites. Mel Moe, Iowa DNR asks landowners and others who locate a chicken lek to please contact him at 515-464-2220 or at Mt. Ayr, Iowa, 5085

Growing Flock

The Iowa DNR reported the spring of 1998 that they located a record 42 prairie chickens on 8 leks, or mating grounds, in southern Iowa within a 100 mile area. It suspects many more are established, but that it's hard to tell because the birds travel so widely. "They are very good at finding each other, at being very mobile. But, a small population is quite vulnerable. Chickens don't let themselves become isolated, which gives us confidence a hail storm, for example, won't wipe them all out. Chickens are survivors. They disappeared once from Iowa, and we're trying not to let that happen again," said the DNR'S Mel Moe.

Iowa's Last Great Chicken Hunt

A historic 1870s shoot and the passing of a splendid bird

By
Walter M. Rosen*

Illustrated by
R. Bruce Horsfall

The first settlers to cross the Mississippi and come into Iowa found the flora and fauna of the great prairies so rich and abundant they thought there would be no end of this great storehouse. Dotting the landscape were thousands of sloughs, marshes and "pot holes." Here in the dense growth of cattails, bulrushes and blueflag were the ducks and other dwellers of the marsh filling the air with their lively chatter.

The music that can come from an Iowa marsh was known only to those sturdy pioneers. Vast acres of blazing-star, prairie clover and purple cone flowers nodded gaily in the breeze. On the uplands the long prairie grasses bowed before the wind and waved like billows on a vast ocean. "Prairie pigeons," golden plovers, were plentiful, and wafted on the summer breeze came the sweet soft call of the upland plover and the louder call of the long-billed curlew. There was life everywhere.

The bird of the upland prairie that filled the larder of many a hungry pioneer family was the prairie chicken. They were here in countless thousands. Their weird "booming" indicated spring had come and with it the mating time for the chickens. The males would then select an open spot on the prairie where they would go through their strutting and courtship antics while the coy females looked on from the nearby bunches of prairie grass. This booming, like the tolling of a deep-toned bell, resounded over the prairies everywhere.

With the coming of the railroad in Iowa, telegraph wires were strung like a web across the state, and many chickens were killed flying into this new and strange obstruction. The section men working on the railroad could always find a plentiful supply of fresh meat by picking up the chickens along the tracks under the wires.

My father, being one of the early pioneers of Boone County, in central Iowa, used to enjoy telling me of the incidents that occurred then, and one of these stories concerned the last organized prairie chicken hunt in our county. My old friend W. H. Crooks of Boone, Iowa, is now the only survivor who took part in that great hunt, and recently I stood at his bedside in the Boone Hospital and listened to the same story that my father used to tell me. Far too many of the stories of those days have been lost and forgotten, but this one should live, for it deals with the prairie chicken, the greatest of all upland game birds. It also portrays what Iowa was, and what Iowa is today.

The bird of the upland prairie that filled the larder of many a hungry pioneer family was the prairie chicken.

A great rivalry

In those early pioneer days, there was a great deal of rivalry in every community as to who was the best marksman and the best hunter. Every man and boy aspired to be the best shot in the county, and they had plenty of practice as there was an abundance of all kinds of game. It was a

custom each fall to have an organized chicken hunt. The two best hunters would "choose up sides" and the losing side would have to give a banquet at the leading hotel for the winners. This was a great event of the year and one always anticipated with much enthusiasm.

Boonesboro was then the county seat. The small village of Montana, nearby, was later destined to become Boone and the present county seat. My father worked in a harness shop in Boonesboro from 1870 to 1874. When he later told me these fascinating stories during my boyhood days in Ogden, Iowa, he did not tell me the exact date of the last hunt but said that it was sometime during those four years. I asked Mr. Crooks at the hospital and he said, "The date on the gravestone of Gene Soule out in the cemetery will settle that." I drove to the cemetery, and after searching for some time finally found an old, weather-beaten marker on which the dates were barely legible. Dimly, it read-"Born June 2 1849-Died Aug. 15 1872."

Eugene Soule, 23, commonly called "Gene," was the local gunsmith in Boonesboro, and was also considered one of the best shots in the county. He was accordingly chosen as captain of one side. Each side had an equal number of hunters and the hunt was to last three days. They assembled near the old court house and scores of people were out to see them start and to wish them success. Father watched them from the front door of the Goetzman harness shop as they started, four or five loads in each party. They used spring wagons, three-seated buggies and single buggies.

Mr. Crooks, being then but 12 years of age, was too young to be a member of the hunting party, but by consistent begging he was finally allowed to go as the driver of one of the rigs. Young "Willie" Crooks was much elated, for his father was one of the hunters and he wanted to "go with Dad" to see him shoot chickens. Their party drove southwest of Boonesboro, across the Des Moines River to Marcy and the surrounding townships just south of what is now Ogden. The other party went northwest from Boonesboro, also crossing the Des Moines River, and hunted up in the northwest part of the county.

For three days the hunt continued. There seemed to be no end of chickens. Today there is not a nesting pair in that section.

Whir of wings

It was a happy, jovial group of hunters and dogs that started on that morning of August 13, 1872, each bent on killing the greater number of chickens. If there happened to be a farm house on a section they would go in at that corner of the farm and would hunt right through that section. "Willie" Crooks would then drive the team around the section and meet the hunters after they had crossed the farm. The whir of wings and the rapid shots were music to the ears of the men and boys. The dogs were all trained retrievers and few birds were lost. At night they would stay either at some farm house, or sleep in the hay loft of a barn.

For three days the hunt continued. There seemed to be no end of chickens. Gene Soule had a "brown hunting dog" that was a good one, and Gene, being a good shot, got plenty of birds. Late in the afternoon of the third day the parties began to return to the old Occidental Hotel in Boonesboro where the banquet was to be held. One by one the wagons filled with men, dogs and chickens arrived. The chickens were counted and a careful record was kept of them all. The last load to arrive was the one containing Gene Soule and his "brown hunting dog."

The awaiting crowd was tense with excitement for the kill of Gene Soule and his party decided the winners. With loaded gun in hand, he sprang from the light wagon, and placing his firearm against the wheel, called to the nearest group asking how many chickens they had shot. After hearing their reply he loudly shouted. "That's nothing. I shot 55 myself."

As Soule called out, he slapped his hand on his thigh with a resounding smack. His dog, still in the wagon, thinking that he was being called, leaped toward his master and landed on the loaded gun against the side of the wheel. The gun was discharged into the side of Gene's face and he fell, a victim of the two things that he loved the best — his own gun and his "brown hunting dog." He was carried to the Occidental Hotel where he died. Suffice it to say, there was no banquet there that night.

1,500 shot

My father, standing across the street in the doorway of the harness shop, was a witness to the scene, as was Willie Crooks. A total of about 1,500 chickens were shot by both parties in this three-day hunt, and these were now given away to the citizens of Boonesboro. The men dispersed, and there never was another organized chicken hunt in Boone County. In fact, even single individual hunters were scarce for some time after this tragic hunt.

During the 65 years that have passed since that day, great changes have taken place in central Iowa. The prairies of waving tall grass have been broken and now one sees little but endless miles of waving cornfields. With the passing of the prairie grass we have also witnessed the passing of the prairie chicken. No more do we hear the booming in the springtime or the whir of wings in the autumn. The passing of this great upland bird from Iowa has been a tragedy. Where once 1,500 could be killed in a single hunt, now not a single nesting pair can be found.

As I knelt in the deep snow of the cemetery, trying to read the inscription on the gravestone of Gene Soule, I wondered whether some day there might not be others kneeling before a monument somewhere, reading the date of the death of the last prairie chicken. I am afraid that day is not far off.

**This article first appeared in Nature Magazine, December 1937.*

Iowa 1999-2000 Hunting Seasons and Bag Limits

SPECIES	SEASON	SHOOTING HOURS	BAG LIMITS DAILY	BAG LIMITS POSSESSION
Youth Rooster Pheasant (age 15 or younger)*+	Oct. 23-24	8:00 a.m. to 4:30 p.m.	1	2
Rooster Pheasant	Oct. 30 - Jan. 10, 2000		3	12
Bobwhite Quail	Oct. 30 - Jan. 31, 2000		8	16
Gray Partridge	Oct. 9 - Jan. 31, 2000		8	16
Turkey (Gun)*	Oct. 11 - Nov. 30	One-half Hour Before Sunrise to Sunset	One Turkey Per License	One Turkey Per License
Turkey (Bow Only)*	Oct. 1 - Dec. 3 and Dec. 20 - Jan. 10, 2000	One-half Hour Before Sunrise to One-half Hour After Sunset	One Deer Per License	One Deer Per License
Deer (Bow)	Oct. 1 - Dec. 3 and Dec. 20 - Jan. 10, 2000			
Deer (Muzzleloader)	Oct. 16 - Oct. 24* (early) or Dec. 20 - Jan. 10, 2000 (late)			
Deer -- Youth (age 12-15) and Severely Disabled	Sept. 18 - Oct. 3			
Deer (Special Bonus Late Season)	Jan. 11 - Jan. 17, 2000			
Deer (Shotgun)	Dec. 4 - Dec. 8 (first) or Dec. 11 - Dec. 19 (second)	Sunrise to Sunset		
Ruffed Grouse	Oct. 2 - Jan. 31, 2000		3	6
Rabbit (Cottontail)	Sept. 1 - Feb. 28, 2000		10	20
Rabbit (Jack)	Oct. 30 - Dec. 1		2	4
Squirrel (Fox and Gray)	Sept. 1 - Jan. 31, 2000	None	6	12
Groundhog	June. 15 - Oct. 31		None	
Crow	Oct. 15 - Nov. 30 and Jan. 14 - March 31, 2000			
Pigeon**	Oct. 1 - March 31, 2000			
Raccoon and Opossum	Nov. 6 - Jan. 31, 2000	None		
Fox (Red and Gray)	Nov. 6 - Jan. 31, 2000	(Open 8 a.m. First Day Only)		
Coyote	Continuous Open Season	None		

* Residents Only. ** Within 100 yards of buildings and bridges, pigeons may be taken year round. + See regulations for complete requirements

1999-2000 *PROPOSED* MIGRATORY GAME BIRD SEASONS AND BAG LIMITS

	STATEWIDE
Ducks, Mergansers and Coots	Sept. 18-22 Oct. 16 - Dec. 9
Youth Waterfowl Hunting Day	Oct. 9
Snow Geese	Oct. 2 - Dec. 27 Feb. 19 - March 10, 2000
Woodcock	Oct. 2 - Nov. 15
Snipe	Sept. 4 - Nov. 30
Rail (Sora and Virginia)	Sept. 4 - Nov. 12

	NORTH ZONE	SOUTH ZONE
Special Canada Goose Season	Sept. 11-12[1]	NO SEASON
Canada, White-fronted and Brant geese	Oct. 2 - Dec. 10	Oct. 2 - Oct. 10 Oct. 16 - Dec. 15

[1] In that portion of the north zone west of Iowa Highway 63, excluding the Big Marsh Wildlife Area (see map below).

Shooting Hours: 1/2 hour before sunrise to sunset.

Daily Bag and Possession Limits:

Ducks: Daily limit is 6, including no more than 4 mallards (of which no more than 2 may be female), 2 wood ducks, 2 redheads, 1 black duck, 1 pintail, and 1 canvasback. Possession limit is twice the daily bag limit.

Mergansers: Daily limit is 5, including no more than 1 hooded merganser. Possession limit is twice the daily bag limit.

Coots: Daily limit is 15; possession limit is 30.

Geese: Daily limit for Canada geese is 2 through Oct. 31 and one thereafter, except in the south zone where it is 2 from Dec. 1-15. For other geese, the daily limit is 2 white-fronted, 2 brant, and 20 snow geese. Possession limit is twice the daily bag limit, except for snow geese for which there is no possession limit.

Woodcock: Daily limit is 3; possession limit is 6.

Snipe: Daily limit is 8; possession limit is 16.

Rail (Sora and Virginia): Daily limit is 12; possession limit is 24.

Youth Waterfowl Hunting Day: Shooting hours and daily bag limits will conform to those set for the regular waterfowl seasons.

Waterfowl zone description. The state will be divided by a line beginning on the Nebraska-Iowa border at State Highway 175, east to State Highway 37, south-east to U.S. Highway 59, south to I-80 and along I-80 east to the Iowa-Illinois border. A portion of the north zone east of Iowa Highway 63 will be closed to Canada goose hunting Sept. 11-12.

the Best of the Best for 1999

by Joe Schwartz

Iowa is blessed with an abundance of good fishing lakes, but fishing at these lakes tends to vary from year-to-year. Fish populations are dynamic and constantly changing. It pays anglers to update knowledge frequently so they are able to concentrate their effort at only the very best lakes. This principle is especially true for people who fish only occasionally. With that thought in mind, let's talk about what DNR fisheries biologists consider the four best fishing lakes in southern Iowa for 1999.

Lake Wapello, located in Davis County, not far from Drakesville, is a 289-acre state park lake. Bluegill is king in this lake, with 8- to 9-inch fish making up most of the catch. These are quality fish and anytime you can consistently catch 9-inch bluegill it is worth trying. Best fishing occurs when big males can be taken from spawning beds in mid-to late May. Try any shallow area along the south side for spawning fish -- with Boy Scout Bay being a perennial top producer. Later in summer, drop-offs adjacent to the north shore, where artificial structure has been placed, are good spots to try. You may also take an occasional dandy crappie or redear sunfish at Wapello. A huge number of bass are found in the lake and are very easy to catch. Most are 12 to 14 inches. Wapello has a "no-kill" regulation on bass so all bass must be returned unharmed.

Lake Wapello

Lake Ahquabi, located 5 miles south of Indianola, has turned into a top-notch fishing lake following a three-year renovation project. The lake was drained, dredged, repairs made to the dam, and extensive fish habitat added to the lake between 1993 and 1996. Following restocking, fish have grown well and an excellent fishery has developed.

A super catch-and-release fishery for 12- to

Lake Ahquabi fishing shelter

Ken Formanek

Ron Johnson

Panfish, particularly bluegills, are a "sure thing" when it comes to southern Iowa lakes.

14-inch bass can be found at Ahquabi. Bass are very common and can be caught about anywhere. Seven-inch bluegill are found in all of the bays in the spring, but deeper structure and the new reefs are the best places to try in summer. Nice 10-inch crappie and dandy 20-inch catfish round out the fish population at Ahquabi.

Ahquabi has a unique fishing shelter that's a perfect place to fish for anyone without a boat or who has difficulty walking the shoreline. It's essentially a small house built on pilings over the lake and easily accessible by sidewalk. Lots of habitat has been placed around and under the shelter to attract fish. Last year more than 25 percent of the fish caught at Ahquabi were taken by anglers using this facility.

Three Mile Lake, near Afton, is a brand new lake that filled in 1998. An impressive sport fishery has already developed there. The lake is wall-to-wall fish and catching a stringer-full is easy. Facilities are new, modern and top notch. Numerous reefs, jetties and flooded timber provide super places to catch fish. Last year, midsummer drift fishing was phenomenal.

A grab bag of species was stocked into Three Mile. Bluegill, crappie, bass, catfish, redear sunfish, walleye and musky are all growing at above-average rates. Most of the bass fishing is catch-and-release, but some are above the 15-inch length limit. Bluegill, crappie, walleye and catfish are easily caught, but sorting out smaller fish will be necessary. A free contour map showing locations of reefs and other facilities is available from the DNR.

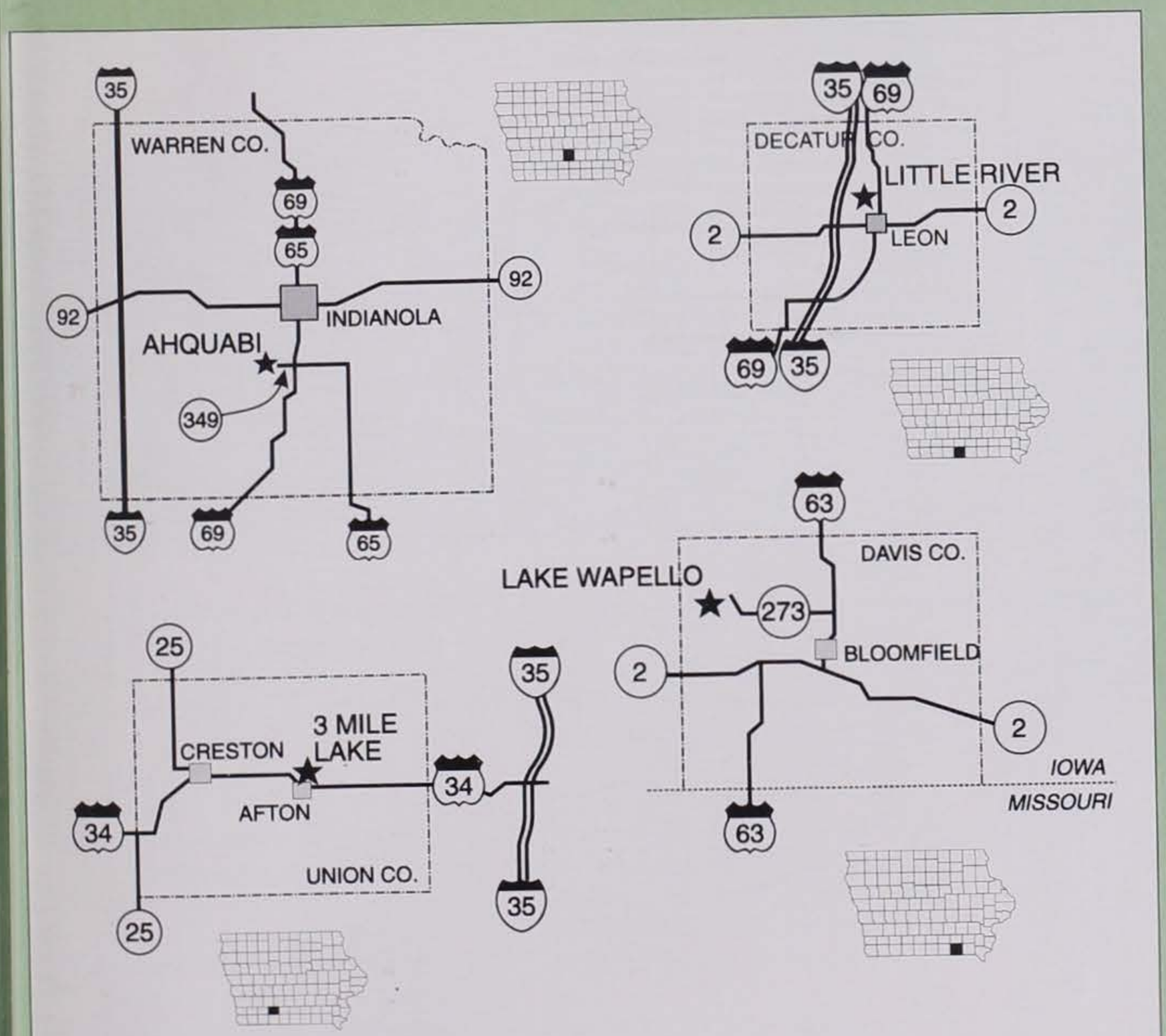
Little River began filling 15 years ago this summer and developed into one of our premier fisheries. At 788 acres, it provides plenty of prime fishable water. Panfish make up the majority of fish caught with bluegills averaging 7-1/2 inches and crappies 8 to 9 inches. Abundant flooded timber is the best place to fish at Little River in midsummer. The shoreline and shallow bays are better earlier. The lake is a good bass lake with many fish 2 to 3 pounds. Walleye fishing is also

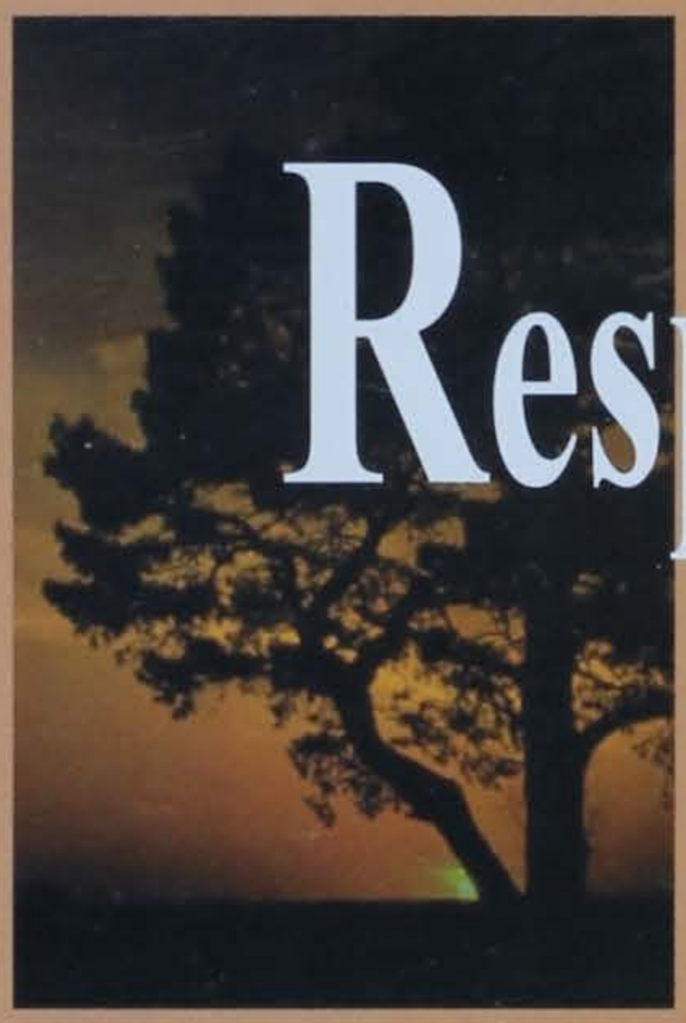
good with 16 inches the usual size. Rocky or sandy points, the face of the dam and reefs are the best places to catch walleye. Recreation facilities, developed by the Decatur County Conservation Board, and its out-of-the-way location in southern Iowa make fishing at Little River an enjoyable experience.

There they are -- the best of the best for 1999. Fish one of these lakes and you will be richly rewarded for your efforts.

Joe Schwartz is a regional supervisor for the department's southwest fisheries district.

Ron Johnson





Respect Your Elders

by Lewis A. Major

Her life began in a place that was dark, dry and dirty. She fought and struggled to be a little better than the rest, to stand a little taller in a world that was unforgiving. Anyone passing by would have agreed that she would not survive long in such a harsh place, but she did.

She has leaned against the strongest of winter winds and has stood alone in the most ruthless of spring rains. Her thick skin has been weathered and scarred from all that a cruel environment could deliver. Yet it was these vicious elements that made her strong, and with the dawning of each new day and every kiss of sunlight, she gained the courage to reach her arms closer to the heavens. Eventually she grew so strong she feared nothing. She had reached the top.

If she could speak, she could tell of things we only read about in history books. She could tell about the massive herds of bison and of the wolves that once preyed upon them. She could tell about the tallgrass prairies that were full of wildflowers and wildlife.

She could tell of the proud ways of the Native Americans and how they treated her with great respect. They would come to her for food, and she would give all that she had, never once asking for anything in return. She could also tell of the day when the wagons arrived and the Native Americans no longer came to see her.

She could tell you about the day when there were no more buffalo to be found. About the day when the wolves had to leave to go find food elsewhere. The reason they left, she would say, is because the wagon people turned the ground upside-down, destroying all the grasses and flowers. She also wanted to leave, but couldn't.

She has shed her colors more seasons that any one human has ever lived. She has enjoyed the thrill of having a friend lay beside her and has felt the pain of loneliness when they would leave. Yet she has stood the test of time.

She was once one of many, but is now one of few. She still lives on a small hillside right here in Iowa, and I'm sure she would love to meet you. However, she can be hard to talk to, for she is not a person. She is a tree, a 190-year-old savanna oak. If you would like to meet her and her fading family, visit Yellow Banks Park in Polk County and catch a glimpse of some of the last surviving savanna oaks in Iowa.

By the mid-1800s, railroads were making their way across the Midwest, and savanna oaks, unfortunately, were the best railroad-tie-producing tree in the area. A 150-year-old savanna oak could produce six to seven railroad ties, and within a matter of 20 years, savanna oaks had all but disappeared from Iowa's landscape.

Their large, low-hanging branches are their most recognizable characteristic, extending out from the trunk 30 to 40 feet. These branches are evidence of several decades of open growth in a unrestrictive environment, a luxury few of today's tree species have.

Aldo Leopold once referred to savanna oaks as the "storm troopers of the forest" because they were the ones marching straight for the open prairie, desperately trying to encroach upon the vast sea of grasses. However, this process of "marching" straight out into the open prairie would take a single oak

Roger A. Hill

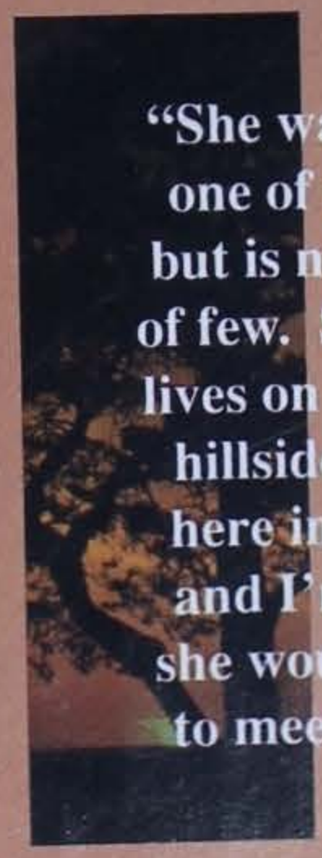
almost 200 years.

These magnificent oaks at Yellow Banks Park stood on that ground long before we decided to call it Iowa. They have lived through 190 years of history and watched six generations of our families come and go. They have withstood intense prairie fires, brutal winters and devastating spring storms. Most amazingly, they somehow avoided the jagged edge of a saw.

Henry Thoreau once said, "A man is rich in proportion to the number of things he can afford to let alone." Unfortunately, the savanna oaks were a treasure we could not afford to leave alone, and as a result, we now lack a unique part of Iowa's natural landscape.

I have always been taught to respect my elders and to listen to what took them a lifetime to learn. Although these mighty oaks cannot speak, and how I wish they could, they do remind me of our past, present and future. When you stop to visit these rare savanna oaks, remember they truly are our elders, so give them your respect. They've earned it.

Lewis A. Major is naturalist with the Polk County Conservation Board.

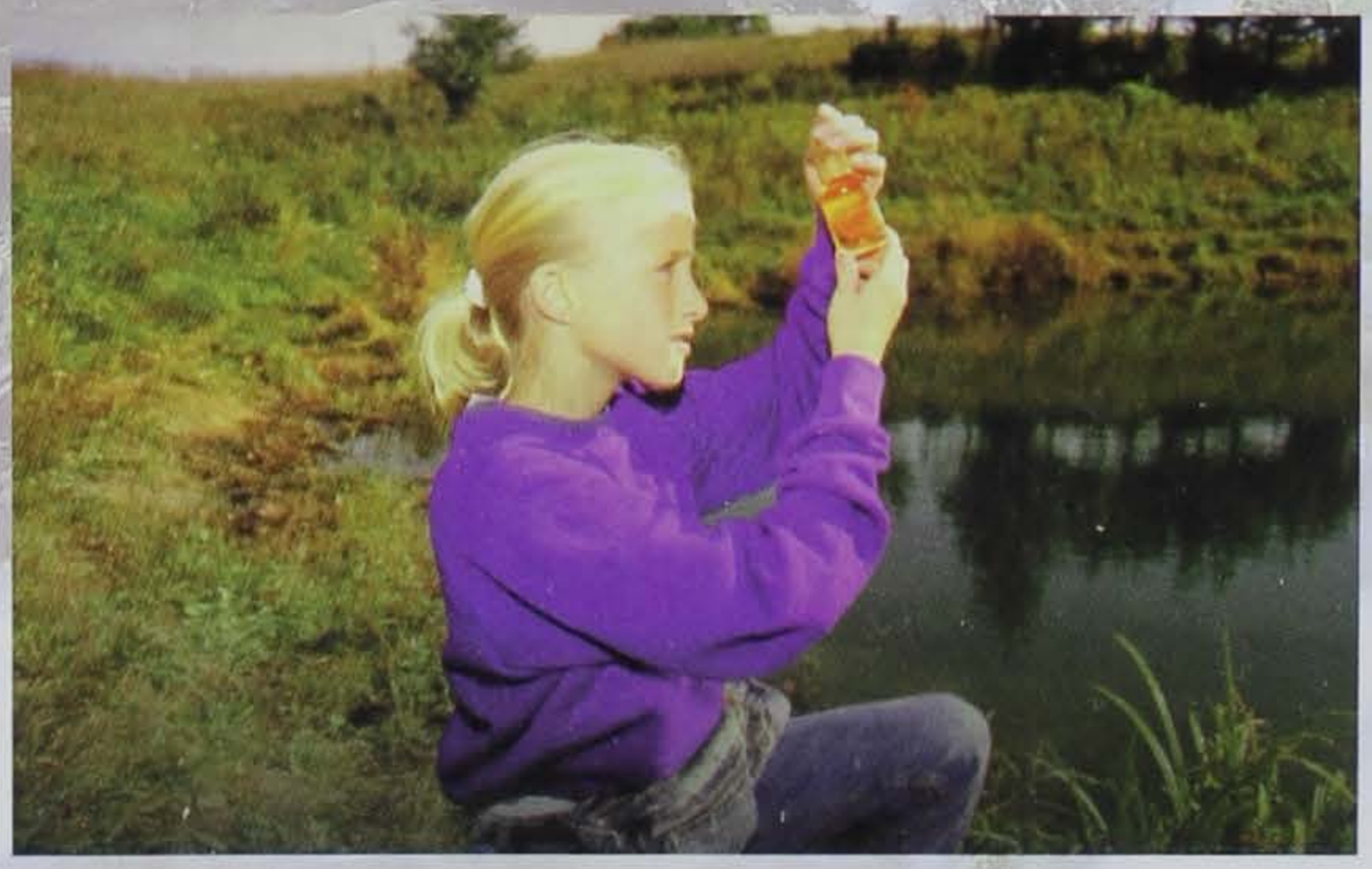


"She was once one of many, but is now one of few. She still lives on a small hillside right here in Iowa, and I'm sure she would love to meet you."

At the turn of the century, our children helped pump water.

IOWATER

Education through Experience



As we start the new millineum, they will tell us what's in it.

Improving Iowa's water quality through individual appreciation and knowledge about local water resources

IOWATER is a statewide, citizen-based volunteer water quality monitoring program that is a direct result of the interest of Iowa's people to improve the quality of our water resources.

The program provides educational materials to assist volunteers in collecting samples and interpreting results. It also will provide a statewide network so that volunteers from across Iowa can share their results with others.

IOWATER is financed and administered by the Iowa Department of Natural Resources, but the success of the program ultimately rest in the hands of the volunteers who participate. The program, like our water, will ultimately be reflection of what we as citizens put into it.

Involving Citizens

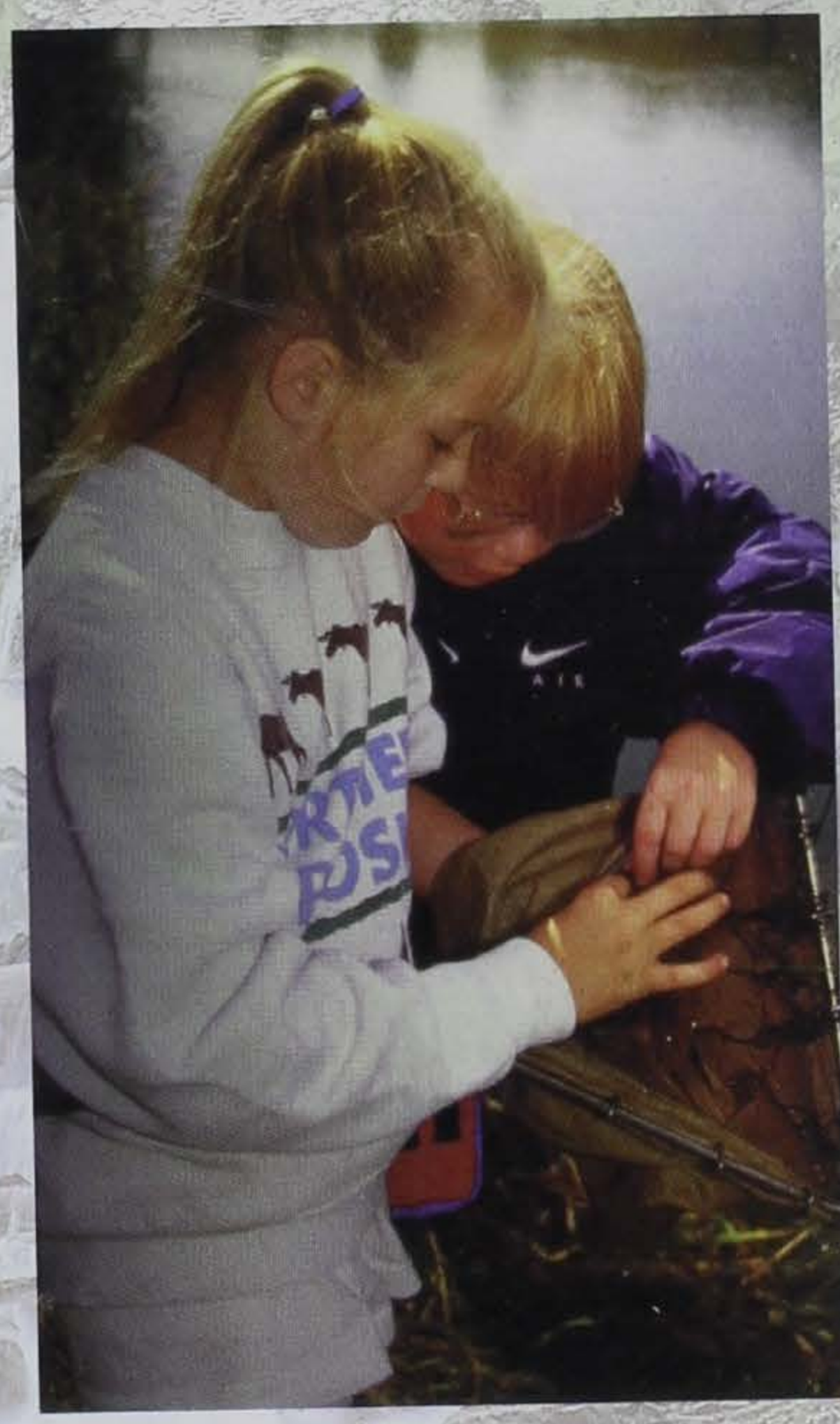
Participants will include school and youth groups, community organizations and individuals. The program will provide instructional materials, training and a system for volunteers to share data and information with other groups around the state.

Linking Land and Water

IOWATER emphasizes looking at the watershed as well as collecting information about the water body. Data collected can provide local groups a valuable tool to determine what influences water quality in their area and, more importantly, what can be done to improve it.

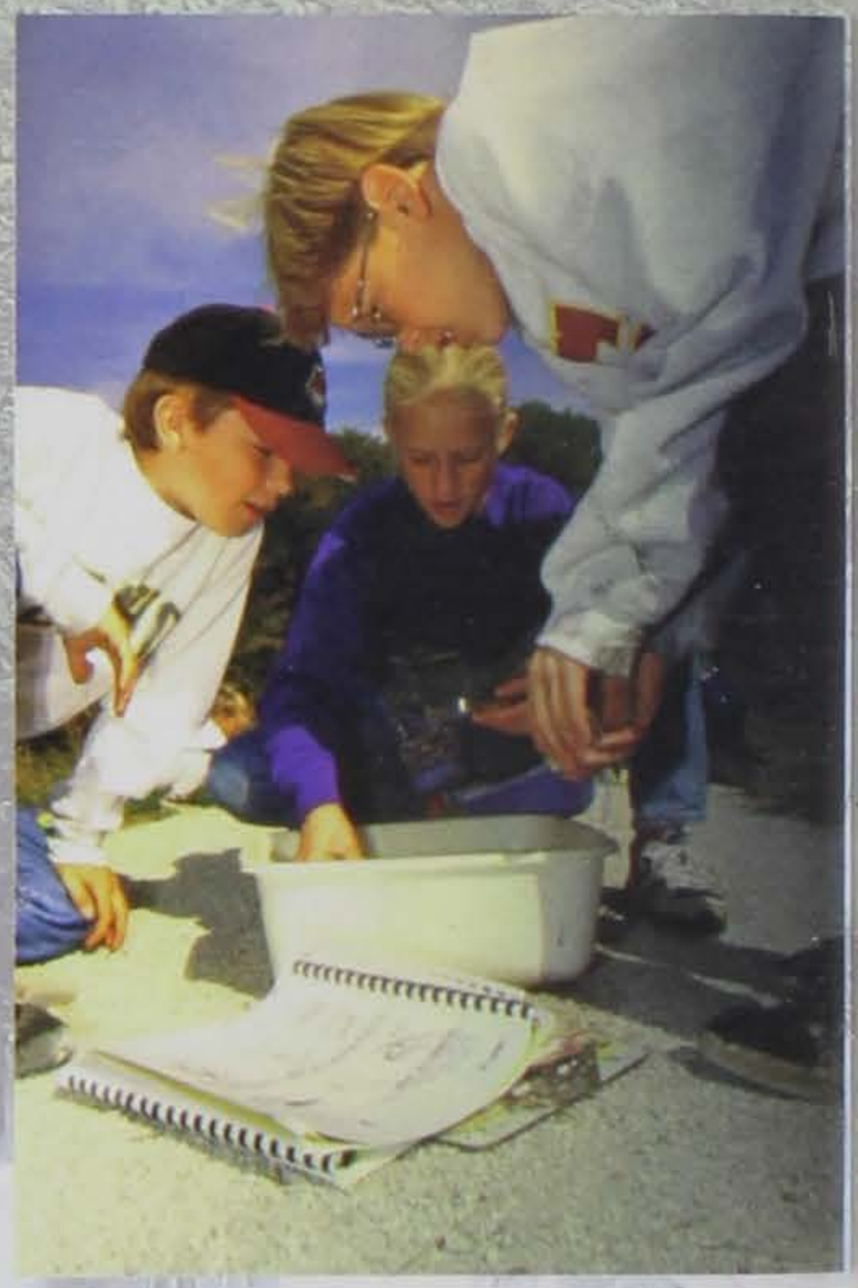
Education through Experience

Iowa educators have long been among the strongest advocates for a statewide monitoring program. Many schools that have been involved with monitoring programs of their own have incorporated monitoring efforts beyond science classes by integrating the students experiences into lessons involving language arts, mathematics, history and even music and art.



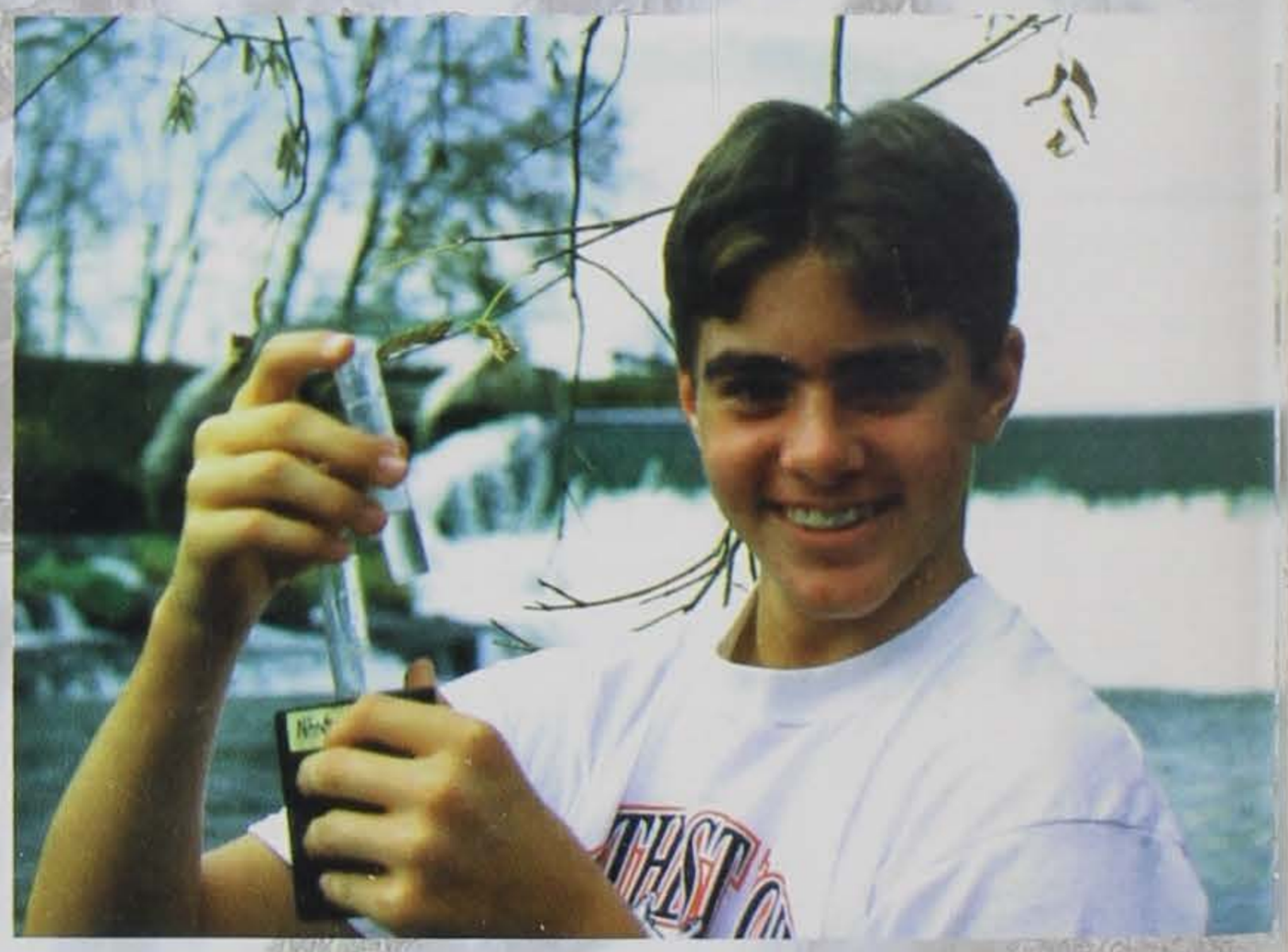
Water monitoring readily provides a sense of relevancy for students because they are applying the skills they have learned to find out more about their own local environment. IOWATER is an opportunity for Iowa students to not only learn more about their environment, but what they can do improve it.

IOWATER is designed to be not only a catalyst for getting new volunteers and students involved, but also to augment existing monitoring programs.



How to Get Involved

All interested parties should contact the project coordinator at IOWATER, Iowa Dept. of Natural Resources, 2473 160th Road, Guthrie Center, Iowa 50115-8515. Telephone at 515-747-2051; Fax at 747-2200 or E-mail at watrshed@pionet.net. Also, details about the upcoming training workshop can be found on the following page.



IOWATER is a cooperative effort of the Iowa DNR; Iowa Environmental Council; Iowa Division of the Izaak Walton League of America; Iowa Farm Bureau Federation; Natural Resources Conservation Service (NRCS); University of Iowa's Hygienic Laboratory and many local groups, organizations and individuals willing to volunteer their time and efforts.

Volunteer Water Quality Monitoring Training Workshop August 6-7, 1999

Springbrook Conservation Education Center
Guthrie Center, Iowa

The two-day training session will include:

- Background information about water quality in Iowa
- Instruction in basic techniques used to collect water quality information
- Hands-on field experience to collect water quality information
- Instruction in planning to help you organize your local volunteer group

Who should attend?
Educators, youth leaders, organizational representatives, and individuals who want to lead a volunteer water quality monitoring program in their area.

Agenda

Friday, August 6

Introduction -- Status of Water Quality in Iowa and the Role of Volunteer Monitoring

The Basics of Monitoring -- Classroom Instruction

- Basic Data Collection -- Mapping, Recording Field Information
- Biological Assessment -- Bottom Critters and What They Mean
- Habitat Evaluation -- Looking at the Physical Characteristics of a Stream or Lake
- Chemical Water Quality -- What's Dissolved in the Water?

Water Monitoring Equipment on a Budget -- Make Your Own

Saturday, August 7

Hands-On Monitoring -- Field Work

- Biological Assessment -- Sampling, Invertebrate ID, Assessing Diversity
- Habitat Evaluation -- Stream Transects
- Chemical Water Quality -- What's Dissolved in the Water?

Data Review and Reporting -- What the Data Says, How/Where to Report

The Watershed Connection -- Water Quality and Land Use

Logistics of Organizing and Maintaining Volunteer Groups

- Developing Goals and Objectives
- Developing/Cultivating Partnerships
- Using Monitoring to Promote Better Water Quality -- Educating Others, Solving Local Problems, Extending Your Involvement

Registration Form

1999 *IOWATER* Training Session
August 6-7, 1999, Springbrook CEC

Name Affiliation

Address

City State Zip

Phone Fax E-mail

Registration Fee $20 **by July 9, 1999** Late Registration Fee $25 **after July 9, 1999**

Lodging (provided free of charge at the DNR Conservation Educaiton Center) _____ Male _____ Female (check one)

Note: Workshop registration is limited. Admittance based on date registration is received.
To register, complete this form and mail with a check for your registration fee (payable to *IOWATER Training*) to:
IOWATER Program, IDNR, 2473 160th Rd., Guthrie Center, IA 50115-8518

A Beautiful

View

A New Dawn for Wind Energy in Iowa

Article by Julie Tack
Photos by Clay Smith

Buena Vista County has an energetic new reason for calling itself the land of beautiful views. The rolling plains that make northwest Iowa so favorable for harnessing wind are now speckled with towering turbines. Two hundred and fifty-nine to be exact. It is the single largest wind project in the nation, with 194 megawatts of electric-generating capacity.

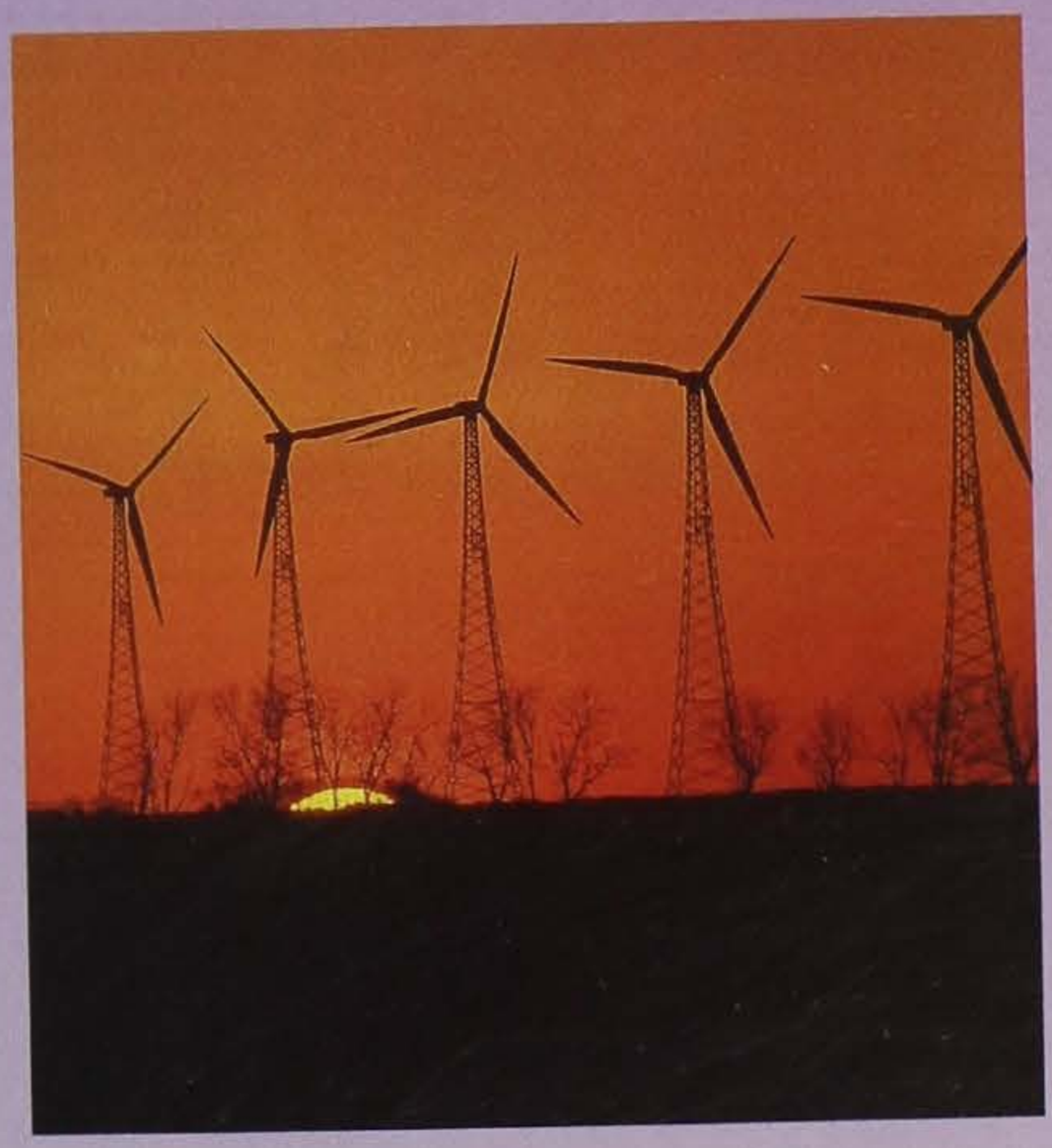
The wind farm, along with 56 new turbines in Cerro Gordo County, make Iowa the third largest producer of wind energy in the nation, behind only California and Minnesota.

Wind energy production of this magnitude has been a longtime in coming for the state. In 1983, Iowa passed the Alternative Energy Production Law, requiring Iowa's investor-owned utilities to purchase 105 megawatts of energy annually from renewable resources. Because of wind energy's decreasing capital costs — coupled with Iowa's strong wind resources — it has become the renewable energy source of choice.

Additionally, wind energy is an attractive alternative for Iowa because it is virtually "clean" energy — no air pollution or greenhouse gases are produced from power generation.

Northwest Iowa is the state's windiest land area. In particular, a crested area, known as Buffalo Ridge, is an ideal setting for wind energy production. The 259 wind turbines are grouped in sets of four or six along Buffalo Ridge and built on land leased from local farmers.

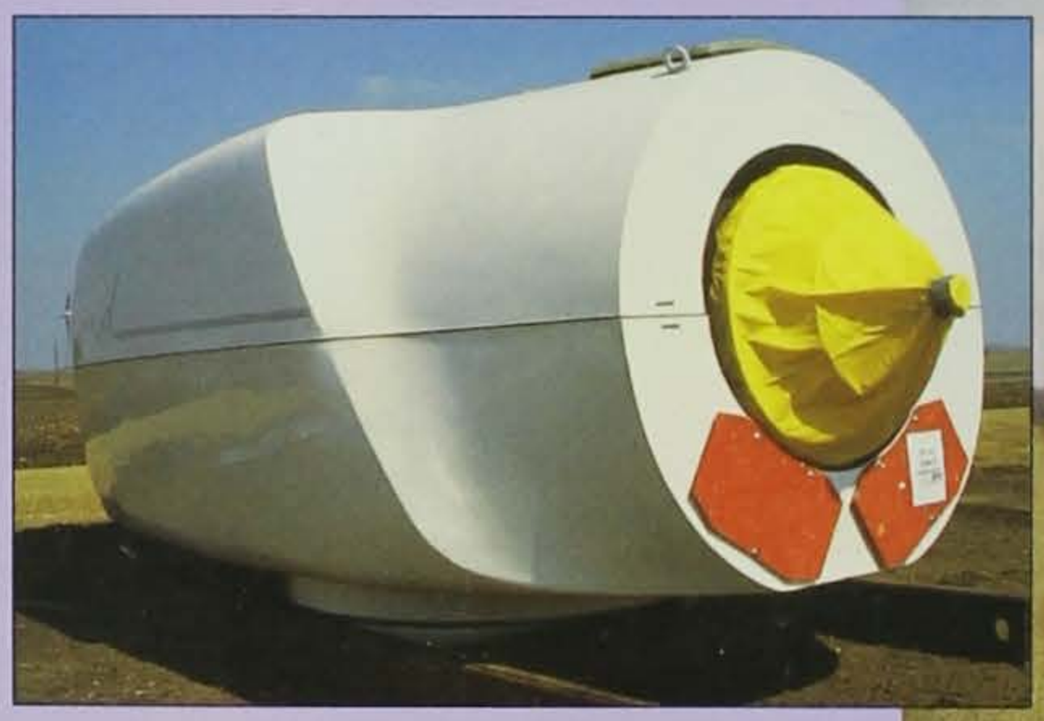
The turbines were constructed by Enron Corporation from Texas and will be on-line by July 1, 1999. The power generated will be purchased by MidAmerican Energy and Alliant Energy.



Wind turbines north of Alta in Buena Vista County.

Building a Wind Turbine

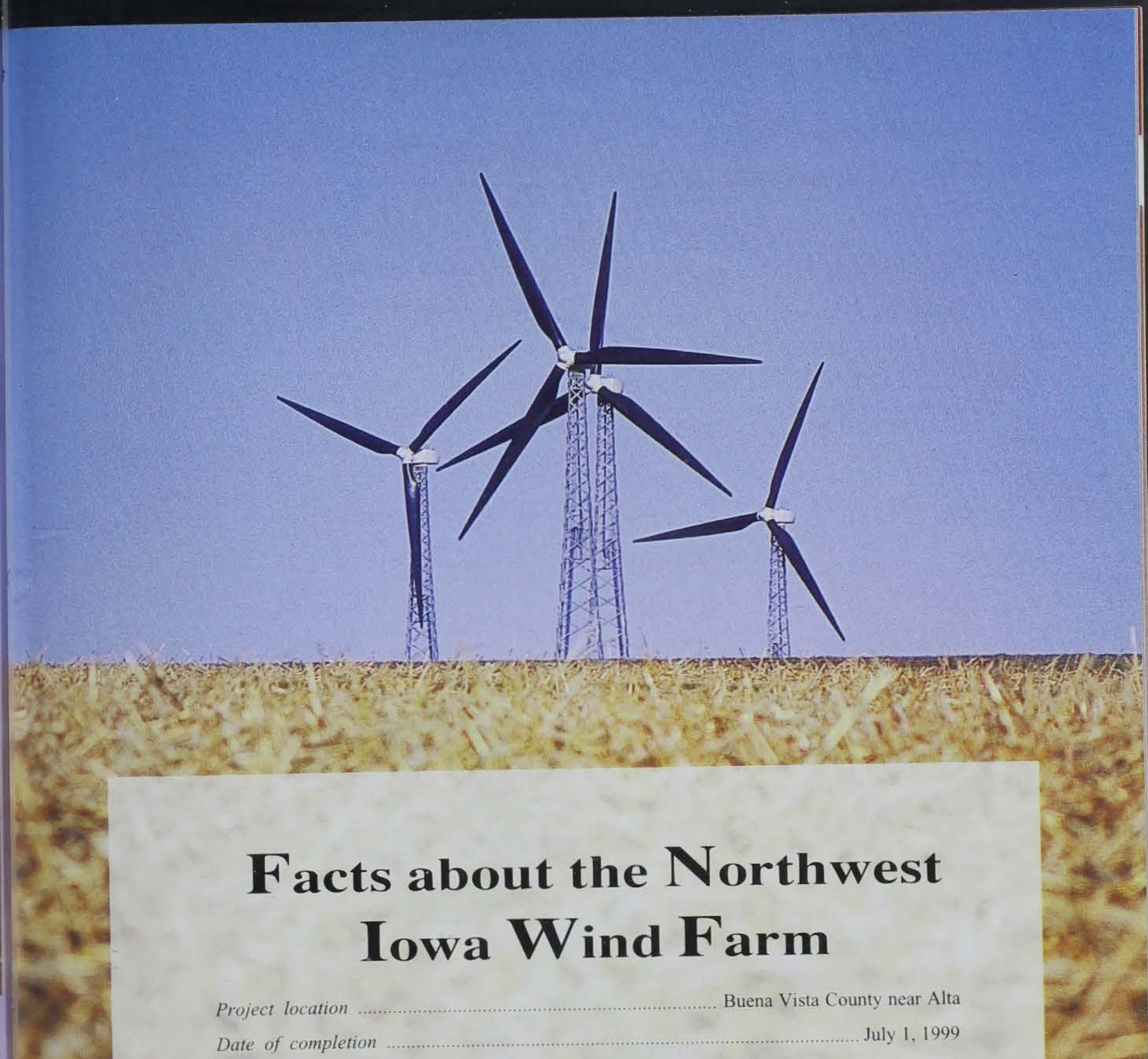
(Below) The "nacelle" acts as the generator for the wind turbine. This nacelle will be placed 200 feet in the air on a tower. (Right) Turbines are constructed primarily in groups of four to six. (Bottom) One turbine blade is 80 feet long — just short of the length between home and first base on a baseball field.



Construction began on the northwest Iowa wind farm in summer of 1998. About 300 workers were needed to grade roads, build turbine pads and construct towers. Once the project is completed, between 20 and 30 employees will maintain and operate the turbines for electricity generation.

Some interesting statistics:

- A tower is more than 297 feet tall from the ground to the tip of a blade
- One blade is more than 80 feet long
- The wind farm spans 2,800 acres, although only 80 acres are taken out of actual production
- More than 100 farmers are leasing land for turbine construction
- The average annual income for a farmer is $2,000 per turbine annually



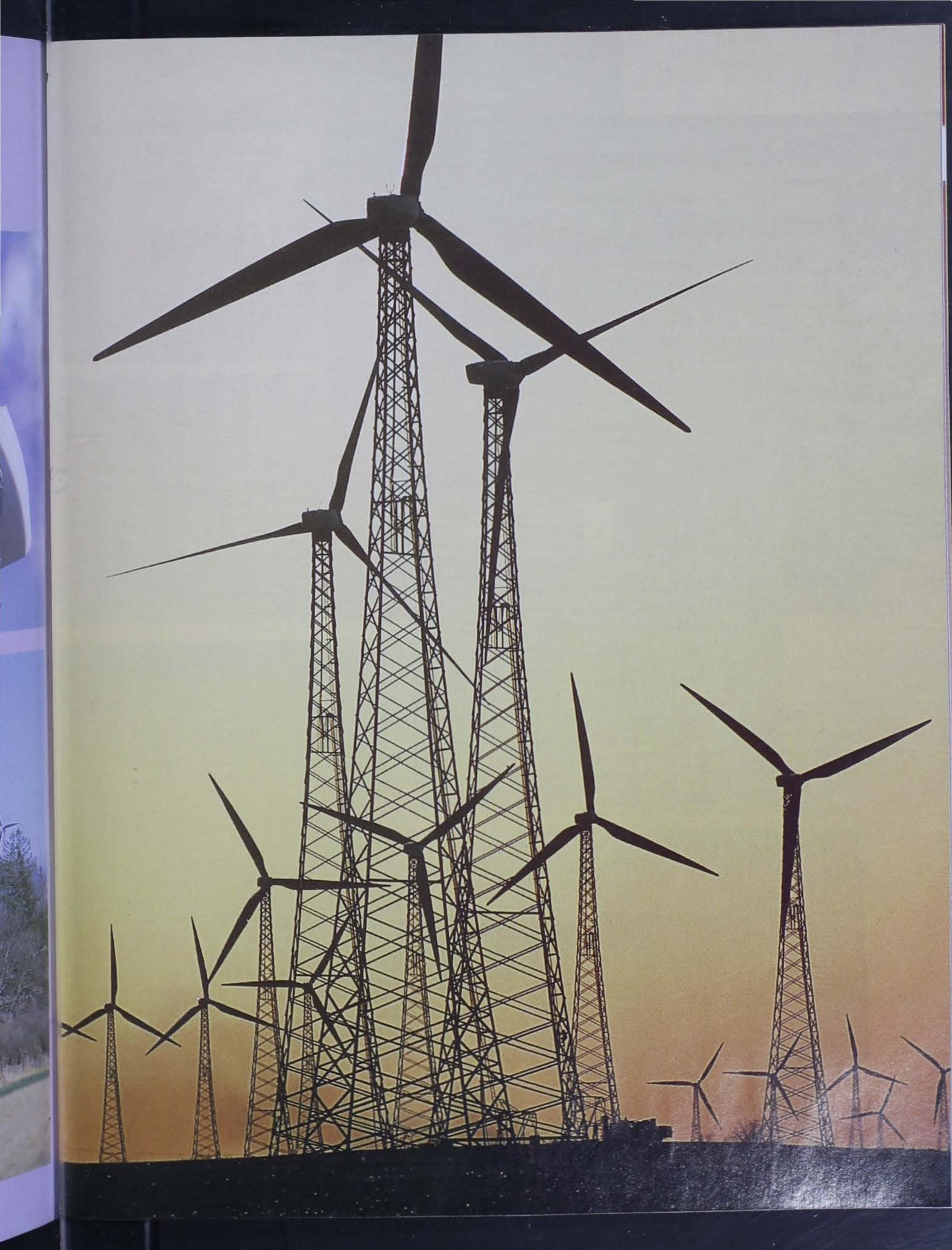
Facts about the Northwest Iowa Wind Farm

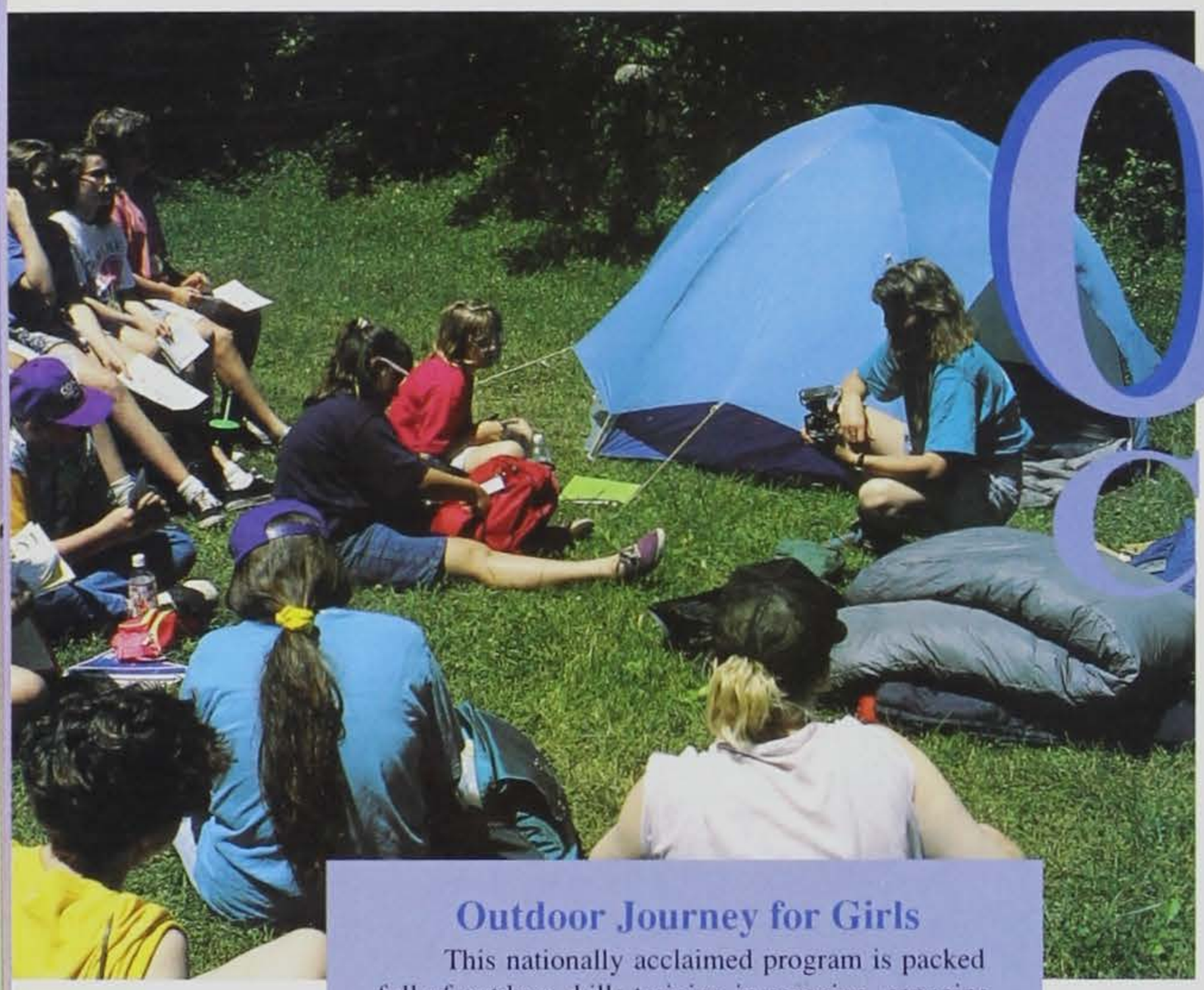
Project location	Buena Vista County near Alta
Date of completion	July 1, 1999
Number of turbines	257 (750 kW each), plus two owned by Waverly Light & Power
Annual generation	600,000 megawatt hours
Enough electricity to supply	71,000 homes
Project power purchasers	MidAmerican Energy and Alliant Energy
Project developer and operator	Enron Wind Corporation, based in Texas
Project cost	approximately $235 million
Emissions avoided	750,000 tons of carbon dioxide; 20,720 tons of sulfur dioxide, 1,834 tons of nitrogen oxide; and 2,417 tons of particulate
Amount of coal displaced annually	278,000 tons

Did You Know...

- Iowa is the 10th windiest state in the nation.
- 40 percent of Iowa's land area is economically capable of generating electricity from wind.
- Iowa has the potential wind energy capacity to produce 5.2 percent of the nation's total electricity consumption.
- When wind speed doubles, the amount of energy in the wind increases eight times.
- Electricity produced from wind energy in Iowa costs between 5¢ and 8¢ per kWh, down from 25¢ per kWh in 1981.

(Top right) Wind turbines are 297 feet high, from the ground to the tip of the blade.
(Right) Wind farms can be a natural complement to Iowa's farms. Only 80 acres were taken out of production to build the 259 turbines in northwest Iowa, and farmers receive income for leasing their land.
(Opposite) The electricity produced from the wind farm is enough to supply the needs of 71,000 homes.





Photos by Ken Formanek

Outdoor Skills Camps

Several camps are planned for the summer at the DNR's Springbrook Conservation Education Center near Guthrie Center. These camps give Iowa's youth ages 12-15 and educators an opportunity to learn outdoor skills that will enhance their enjoyment of Iowa's natural resources.

Outdoor Journey for Girls

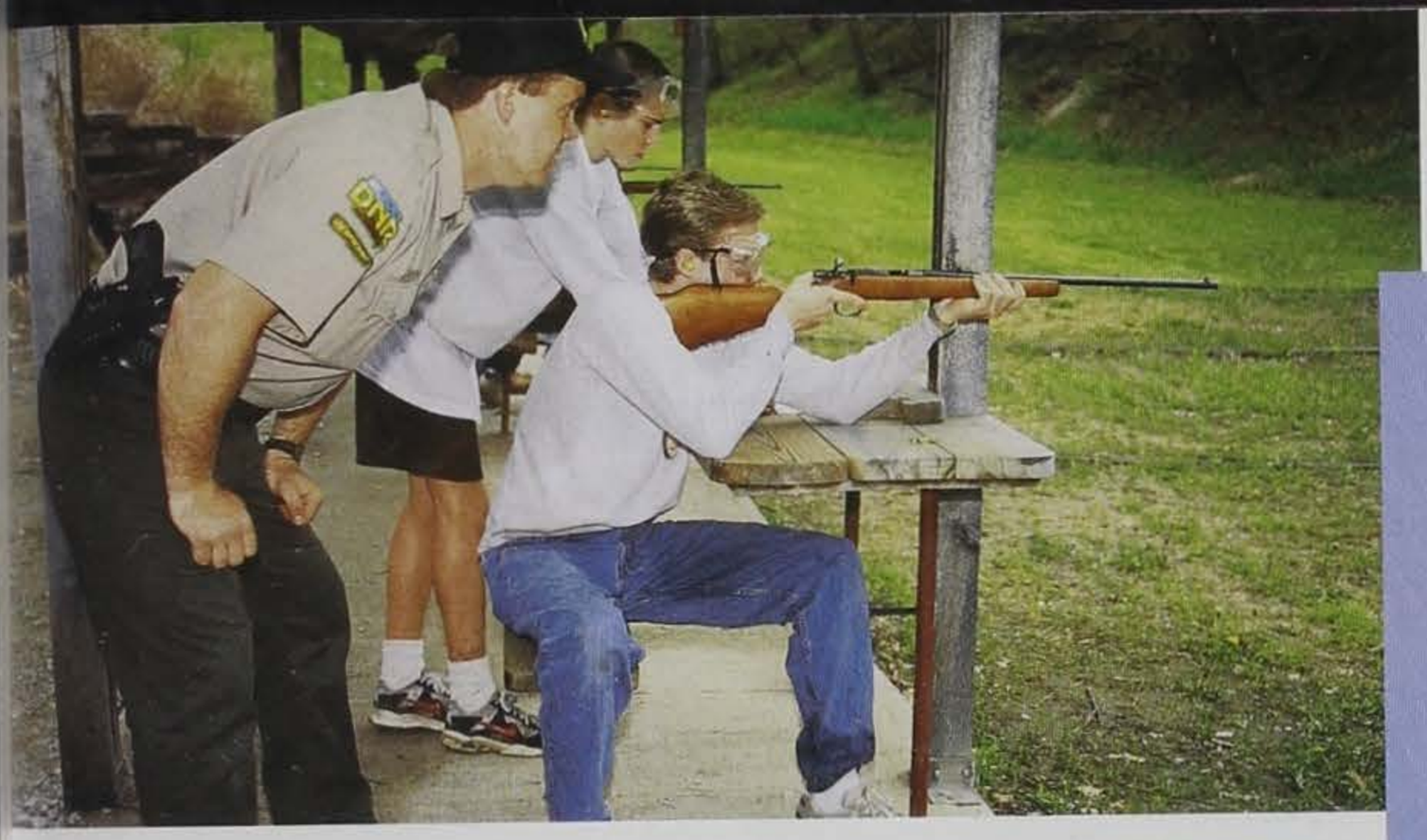
This nationally acclaimed program is packed full of outdoor skills training in camping, canoeing, orienteering, fishing and certification in the Iowa hunter education program. Dates for this year's camp will be June 10-12 or July 29-31. Pheasants Forever chapters throughout the state may cover the $70 registration fee for girls who come from that chapter area. Interested persons should contact their local Pheasants Forever chapter for registration information.

Iowa American Wilderness Leadership School II (AWLS II)

(for adults only)

This newly developed program is designed to compliment AWLS I and offer a different set of activities in the same type of educational setting. Participants will experience farming practices, wildlife research, renewable energy sources, shooting, overnight canoeing, birding, along with visits to the Rockford Fossil Beds (pictured), Raccoon River and area farms. This program is also sponsored by the Iowa Department of Natural Resources and the Iowa Chapter of Safari Club International.

This program is held at the Springbrook Conservation Education Center, which includes air conditioned dorms, high quality meals and beautiful surroundings. The school will be held July 20 - 24 at a cost of $125 which covers all food, lodging, programming and materials. There are also three graduate credits available from Drake University for an additional fee. For more information call A Jay Winter at (515) 747 - 8383, or E-mail at ajwinter@pionet.net.



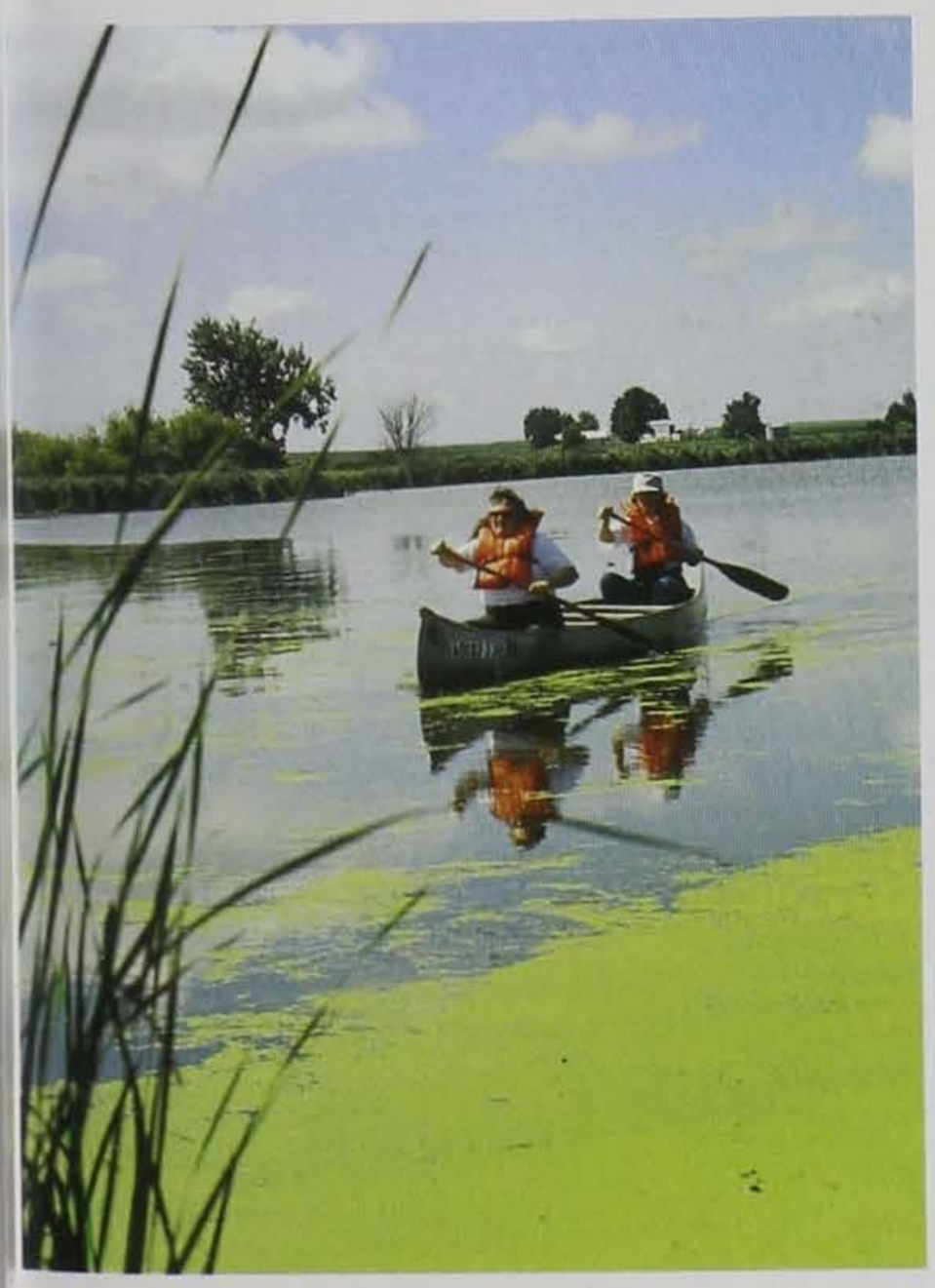
Hunting and Conservation Camp for Boys

This three-day camp will give boys a chance to learn or improve their skills in muzzleloading, shotgun shooting, hunting dog training, furharvesting, turkey hunting, game calling, duck hunting along with learning good wildlife conservation practices. Dates for this year's camp will be June 16-18 or August 11-3. Pheasants Forever chapters throughout the state may cover the $70 registration fee for boys who come from that chapter area. Interested persons should contact their local Pheasants Forever chapter for registration information.

Ted Nugent Kamp for Kids

The Iowa DNR and Iowa Bowhunters Association are working in conjunction with the Ted Nugent Kamp for Kids to provide a 3-day camp for youth on July 16-18. This camp provides both boys and girls the chance to become certified in the International Bowhunting Education Program and includes such activities as: why we bowhunt, responsibilities and ethics, scouting, signs and methods, tree stands and blinds; first aid and survival and field dressing and game care.

Cost for the camp is $75 with a limited number of $50 scholarships available. For registration material contact Gloria Baker, Springbrook Conservation Education Center at (515) 747-8383.



Iowa American Wilderness Leadership School (AWLS)

(for adults only)

Have you ever wanted to experience the great outdoors and really find out what Iowa has to offer, then the Iowa American Wilderness Leadership School is for you! This program is designed for teachers and other educators to gain experiences and then take these experiences back to their classroom. To accomplish this, the participants will be involved in hands-on activities such aquatic study, shooting, backpacking, canoeing, stream table, water testing, Fish IA! instruction, and visits to Bundt Prairie, Lakin Slough and the Raccoon River. These activities are approached in a nonthreatening setting and will take you from the beginner level to the point of proficiency. The program is sponsored by the Iowa Department of Natural Resources and the Iowa Safari Club International.

This program is held at the Springbrook Conservation Education Center, which includes air conditioned dorms, high quality meals and beautiful surroundings. The school will be held June 21 - 26 at a cost of $125 which covers all food, lodging, programming, and materials. There are also three graduate credits available from Drake University for an additional fee. For more information call A Jay Winter at (515) 747 - 8383, or E-mail at ajwinter@pionet.net.

Stocking Iowa's Lakes and Streams

Article by Mike Mason • Photos by Clay Smith

Each year in late March or early April, northern pike and walleye spawn in many areas throughout Iowa. At this time, fisheries personnel begin their search for brood stock to produce enough eggs, and resulting fry and fingerlings, to stock Iowa lakes and streams. Generally, northern pike are the first of the two species to begin their spawning runs.

Iowa fisheries personnel have targeted the northern pike that move into the shallow backwater areas of the Mississippi River as the brood stock of choice. A three-person crew from the Guttenberg Management Station place up to 30 trap nets in Pools 10 and 11 to collect brood fish for spawning operations. The goal of the crew is to collect about 60 adult females and 180 adult males for every one million eggs needed for hatchery production. The usual goal is to collect up to three million eggs. Unfortunately, decreasing habitat has made the job difficult for the crews and locating enough fish can be a challenge.

All northerns collected are transported to the basement of the Guttenberg Management Station. Free-flowing eggs are stripped from females and then sperm from 3 to 5 males is added to each liter of eggs. About 65,000 northern pike eggs constitute a liter. A salt water solution is then added to the egg and sperm mixture to activate fertilization. Up to three liters of eggs will be placed into hatching jars and the eggs will incubate for about five days before they begin to "eye-up" and a total of nine days before they hatch. Females without free-flowing eggs are injected with a hormone derived from carp pituitary glands. The natural hormone stimulant induces egg release speeding up the normal spawning cycle of the fish.

After hatching, some 50,000 fry are placed into water-filled plastic bags, oxygen is added and the bags are sealed for transport to rearing ponds at Fairport Hatchery or are stocked directly into selected waters. Stocked areas include segments of the Cedar, Iowa, Maquoketa, Shell Rock, Wapsipinicon and Winnebago rivers. Lakes stocked include Arrowhead, Badger, Beeds, Blue, Browns, Clear, Crystal, Diamond, George Wyth, Little Wall, Macbride, North Twin, Saylorville, Silver, Snyder Bend and Sweets Marsh.

Fisheries personnel collect walleye brood stock from several Iowa lakes. Crews set gill nets in the late evening in

Crews from the Guttenberg management station set up approximately 30 trap nets in river pools to collect northerns for spawning operations. (Left) Free flowing eggs are stripped from females and then sperm from 3 to 5 males is added to each liter of eggs collected.

The net traps are checked every few hours and adults are returned to stripping stations either at the lake or nearby hatcheries. Once the fry are produced at the hatcheries, they are shipped around the state or to other hatcheries in plastic bags.

Clear Lake, Rathbun Lake, East and West Okoboji, Spirit Lake and Storm Lake. The nets are checked after a few hours and adult walleyes are returned to stripping stations either at the lake or nearby hatcheries. Eggs from free-flowing females are stripped into a pan. Sperm from several males is placed into the pan and water added. After a few minutes of stirring, the mixture is added to a clay solution to prevent the eggs from sticking to each other. The eggs are then placed into fine-mesh "keeps" or trays to allow the eggs to absorb water during their most fragile stage of development. After a few hours, the eggs are placed into incubation jars. There are about 150,000 walleye eggs to the quart and up to 350,000 eggs are placed into each hatching jar. Several thousand adult walleyes are collected every year from six lakes producing more than 120 million walleye fry at Rathbun and Spirit Lake hatcheries.

As with the northern pike, the newly hatched walleye fry are shipped around the state or to other hatcheries in plastic bags. Fairport, Mt. Ayr and Spirit Lake hatcheries place the small fry into rearing ponds to achieve a 2- to 3-inch fingerling. Hatcheries at Spirit Lake and Rathbun further rear these fish to more than 7 inches by fall. They are then stocked into selected waters around the state.

Mike Mason is a fish culture section supervisor with the department.

Mending Nets

Article and photos by Joe Wilkinson

With his two pupils on hand, the instructor began his session. Rough, calloused fingers held the 3/4-inch nylon mesh apart while the other hand wove replacement cord into place.

"A lot of it depends on how you use your fingers," stressed the teacher.

The students observed. Later, they would give it a try. By day's end, the teacher could walk away.

The lesson plan was being followed in the work area of the Department of Natural Resources Lake Macbride Fisheries Station near Solon. Nets were being mended.

It isn't a class you will find in the fish and wildlife curriculum catalogs on campus. Book learning doesn't help when you need to build or repair fishing nets. That's when retired fisheries biologist Bob Middendorf passes along the fading art of net building. Dubbed "Professor Middendorf's School of Net Mending" by fisheries workers Kevin Hansen and Scott Grummer, it not only revives a little-used fisheries skill, it saves money too.

"We have $600 budgeted for nets this year," explained Hansen, a former seasonal worker out of the Macbride Station, now a fisheries technician at the DNR's Fairport Hatchery in Muscatine. "The bids were right at $585-600 per net. I can buy the netting and build three or four for the same amount."

The heavy duty nets are a staple during the course of a year. In a few days, workers will be setting them for the northern pike hatchery operation at Guttenberg. Walleye spawning follows a couple weeks later in some of Iowa's big lakes.

Across the state, spring and fall population sampling would be impossible without the tunnel-like fyka nets or long gill nets. Fish caught in the nets are weighted, measured for length or stripped of eggs and then released without harm.

"During the summer, when we set them out, we will have snapping turtles or muskrats get in and chew small holes in them," explained Grummer, the fisheries technician at the Macbride Station. "We repair them in the winter months, so the nets are ready to go in the spring."

Middendorf, of Solon, when repairing a tear, is as patient as an instructor in a cross-stitch class. With one hand guiding the five-inch plastic shuttle through the net, he anchors the knot to a good web.

A wave of burning candle under the nylon netting welds the knot.

"When I started, we built everything ourselves," recalled Middendorf. "Nets were just cotton webbing 50 years ago. We could heat coal tar to waterproof the nets. It was hard as a rock when cold. We couldn't get it too hot or it would burn the nets. It isn't something you just sit down and do. You need somebody who knows how to do it. Then, the more you do it, the more proficient you become."

He points with pride to some of the older nets.

"Some of those are 25 years old. If you take care of them, the nylon ones will last forever. You use them in the summer then you go over them in the winter to get them in shape for next year. There's always maintenance."

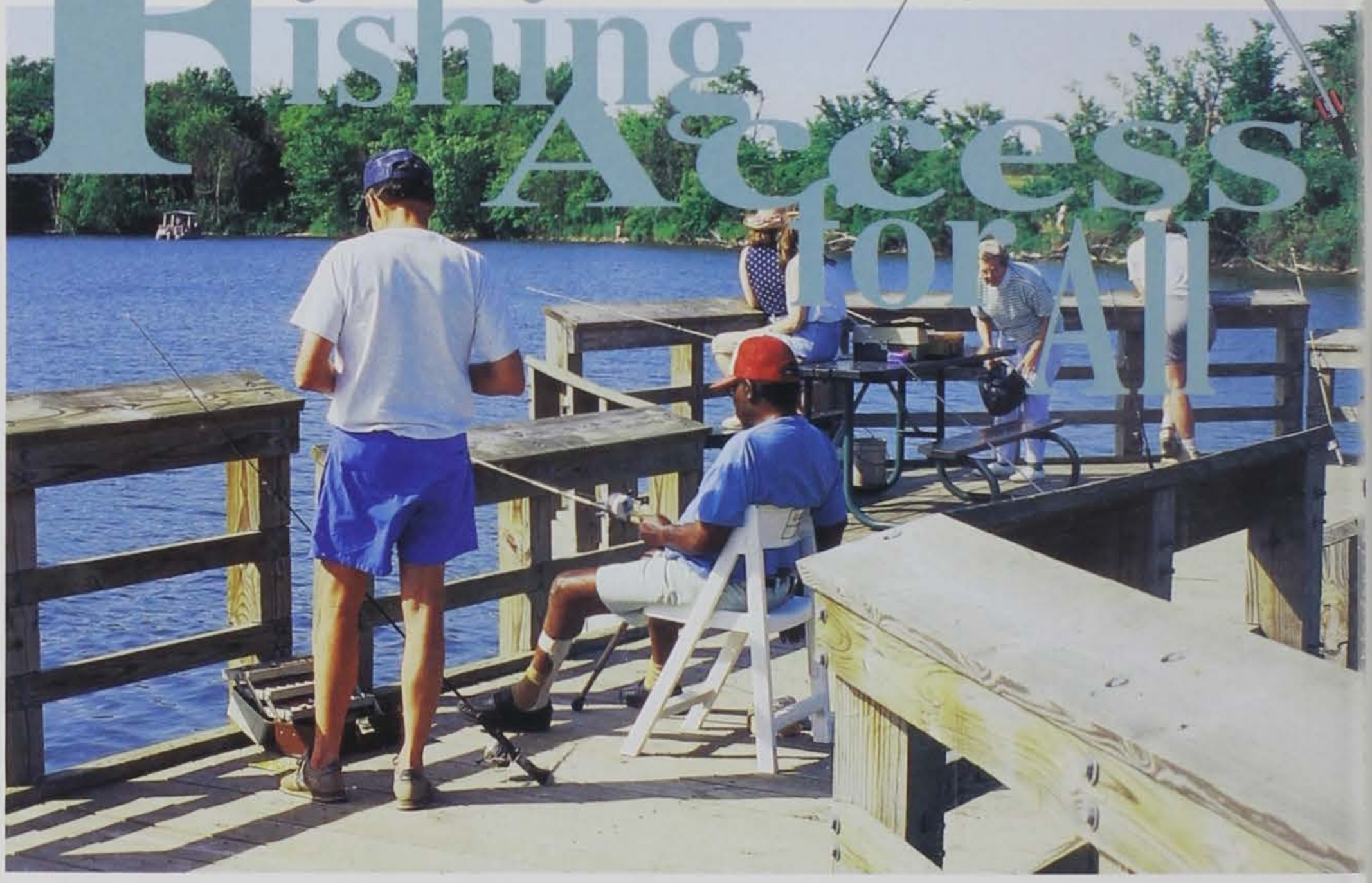
And if today's generation of fisheries biologists return the favor, so will the tradition of net building. "It's sort of like the torch is being passed from the old school to the new," Hansen said. "I'll be back. This isn't the last lesson."

Joe Wilkinson is an information specialist with the department in Iowa City.

Retired fisheries biologist Bob Middendorf teaches Scott Grummer (L) and Kevin Hanson (R), fisheries technicians at Lake Macbride, to mend fishing nets. Middendorf has been mending nets for approximately 50 years.

Fishing Access for All

by Martin Konrad



Fishing is one of most enjoyed outdoor recreational activities in Iowa. It ranks as the highest activity people participate in while visiting a state park. Fishing is definitely a family sport and one enjoyed by all regardless of age or physical ability.

Almost 65 percent of all fishing trips taken each year are done from the shoreline. To enhance these fishing experiences, the DNR actively develops parking areas, pathways, jetties and piers on lakes and trout streams. These developments are designed and strategically located to provide angler safety, easy water access and a greater chance to catch fish.

Parking and pathways enable families with small children and people with difficulty walking easy access to water. Often the path will be surfaced with a fine chipped rock or have a hard surface. On lake shores, a pathway will lead either to a fishing jetty or pier. For trout streams, the pathway will skirt the stream and in areas be at stream's edge.

Lake shores are often difficult to fish due to tall grass, brush, shallow areas and aquatic vegetation. The jetty or pier is designed and located to get anglers away from an unpleasant shoreline and to deeper water where the chances of catching fish are greater. The rock armoring around the jetty and placement of fish habitat within casting distance are habitats that attract fish. The deep water surrounding them is often free of hook-collecting vegetation.

Fishing piers make for the easiest access especially for those confined to wheelchairs and for families with small children. The decking material is either of plastic or wood. A railing surrounds the pier deck and has open slots at regular intervals. The open slots allow people to land fish without hoisting them over the rail. The ultimate pier is found at Lake Ahquabi. It has an enclosed shelter; the angler is able to fish the outside perimeter of the pier or the sheltered interior.

You, the angler, have made the lake and stream access program possible. You have done this through the purchase of your fishing license and fishing equipment. Each time you purchase equipment a portion of the money is collected by the federal government through the Sport Fish Restoration Act. The federal government then apportions money back to the states for the purpose of fish restoration activities. For Iowa this means approximately $3 million each year. Improved shore development is one of the many ways the Iowa DNR puts your angling dollars to use.

The following tables list the lakes where the DNR has constructed piers and jetties, and trout streams where pathways make easy access to the stream. Many of the lakes have more than one jetty. Give them a try for a more enjoyable fishing experience.

Lake	County	Jetty	Pier
Ahquabi	Warren	X	X
Anita	Cass	X	
Big Creek	Polk	X	X
Beaver	Dallas	X	X
Beeds	Franklin	X	
Black Hawk	Sac		X
Bussey	Clayton		X
Cornelia	Wright	X	
Clear	Cerro Gordo	X	
Darling	Washington	X	
Fogle	Ringgold	X	
Geworge Wyth	Black Hawk		X
Green Valley	Union	X	X
Icaria	Adams	X	X
Keomah	Mahaska	X	
Little river	Decatur	X	
MacBride	Johnson		
Manawa	Pottawattamie		X
Meadow	Adair	X	
Morman Tail	Adair	X	
Prairie Rose	Shelby	X	
Rock Creek	Jasper	X	
Spirit Lake	Dickinson		X
Springbrook	Guthrie	X	
Storm	Buena Vista	X	X
Sugema	Van Buren	X	X
Swan	Caroll		X
Three Mile	Union	X	X
Union Grove	Tama	X	
Upper Pine	Hardin	X	
Volga	Fayette	X	X
Wapello	Davis	X	X

Trout Stream	County	Pathway
Bankston Creek	Dubuque	X
Clear Creek	Allamakee	X
Richmond Springs	Delaware	X
Sny Magill Creek	Clayton	X
Trout Run	Winneshiek	X

Martin Konrad

A paved path along Richmond Springs trout stream at Backbone State Park ensures good fishing for all. Big Creek's fishing pier (opposite) is enjoyed by many.

SPORT FISH RESTORATION

Martin Konrad is an executive officer for the department's fisheries bureau in Des Moines.

Coming to America

For one English-reared sportsman, hunting the Iowa grasslands is a dream come true.

Mark Bolton prepares to hunt Iowa pheasants with his trained peregrine falcon. Reared in the open countryside near Liverpool, England, Bolton came to America in 1987, seeking the truth behind the legend of a country where even the "ordinary working class" could find abundant opportunity to pursue the outdoor life. Fact proved larger than legend, and he has not returned to his native homeland.

I first crossed trails with Mark Bolton in 1988. He had just arrived here from England, and our mutual passion for bird dogs, falconry, and trout fishing kindled an instant friendship. I soon learned, in fact, that it was Bolton's overriding desire to hunt and fish that had lured him to America in the first place. It is also the reason he has not returned to his native homeland.

A wildlife artist and graphic designer by trade, Bolton now resides in central Minnesota, and during the bird season we get together on a near-weekly basis. His favorite pastime centers on the pursuit of Iowa pheasants and partridge. After the hunt, our "fireside discussions" frequently focus on the vast difference between opportunities available to American hunters versus European hunters. Bolton's insights on the subject are well worth sharing. For those of us living in the Heartland, they should provide more than a little food for thought. And for all of us who freely enjoy the Iowa outdoors, these startling contrasts bear vivid testimony of how truly fortunate we are.

As is the case elsewhere in Europe, England's hunting and fishing opportunities are largely limited to citizens of upper-class standing. And although Bolton enjoyed a lifelong interest in native fish and wildlife, his middle-class background prevented a "hands on" participation in field sports. One of

his most vivid boyhood memories is of being physically evicted from a trout stream by the local water bailiff.

"Of course, we had no equipment and weren't actually fishing," recalls Bolton. "We just wanted to peer into the water and see the trout, and that was still considered a crime."

So much for British trout fishing.

Bolton's early exposure to hunting was decisively more positive. One of his most memorable adventures began when he gained employment as "cadge boy" for a party of well-heeled German falconers en route to the moors of Scotland in search of red grouse. (A cadge boy is the European equivalent of a golf caddie. However, instead of a bag of clubs, the boy carries a perch containing four of more trained peregrine falcons.)

Although these safaris provided exciting, first-hand glimpses into the field sports, Bolton still yearned to be more than a spectator. His dream was to become a hunter, and that dream became a reality when he journeyed to America.

"Both England and Scotland support abundant populations of upland gamebirds, and during winter there are large concentrations of waterfowl as well," says Bolton. "But the big difference between America and England is the accessibility to that game."

"Hunting in England is very different from hunting in Iowa. For one thing, you don't find public hunting areas over there," says Bolton.

"Virtually all land is privately owned, and the fish and wildlife are treated as private property. Gaining access to those resources is extremely limited and very expensive. You don't just knock on a farmer's door and go hunting," he adds.

Throughout Great Britain there are basically two ways to acquire hunting rights. You either receive a formal invitation from the landowner, or you purchase a membership in an established syndicate. Even after buying into a syndicate, a hunter may still be restricted to only a couple of outings per month.

The shooting of driven grouse is one of the most extreme examples of the exorbitant costs associated with European gunning. Maintaining suitable [red grouse] habitat requires extensive land ownership, employment of full-time gamekeepers, and intensive habitat management. During the actual hunt, lines of 50 or more paid beaters drive grouse toward moorland gunners who are stationed at stone shooting butts. Although such hunts may yield bags exceeding 200 wild grouse per day, the gunning is strictly by invitation and remains the domain of millionaires and royalty.

"In Iowa, I'm enjoying everything that royalty pays dearly for back home."
— Mark Bolton

The shooting of driven pheasants is a similarly expensive endeavor that requires massive organization and often includes supplementing wild pheasant populations with the release of hundreds of pen-raised birds.

The most affordable pheasant hunts involve shooting birds over pointing dogs. The main expense here is the hiring of a gilley (guide) who provides the pointers and, most importantly, has legal access to bird habitat. Although this easily ranks as the cheapest available form of English shotgunning, the cost still remains well beyond the reach of "ordinary working class people."

The prospects of obtaining an English duck hunt are equally dismal. Although vast numbers of waterfowl winter in the British Isles, gaining access to private marshlands is a virtual impossibility.

"Waterfowl hunting [in England] is not nearly as popular as it is here in North America," says Bolton. "There is a very strong public interest in ducks and geese, but because of the expense, they are generally more important to birders than they are to hunters.

"To me, being able to hunt in Iowa is like a fantasy come true. All you need to do is buy a hunting license and you automatically have access to thousands of acres of public lands. The number of gamebirds here is quite incredible, and I don't think there's any question that the [pheasant] populations are as good as any other location in the world."

"I still keep in touch with friends back in England, and they really can't comprehend what it's like to hunt in Iowa. When I tell them that I can run my own setters on either public or private lands, and that I have access to totally wild pheasants, they act as if I'm spinning a yarn," says Bolton.

To put the disbelief into perspective, one of Bolton's friends is currently paying an annual fee of 7,000 pounds ($11,900 U.S.) for the privilege of flying his falcons over a single tract of land. Hunting the same field with a shotgun would require "some serious money."

"[In Iowa] there are days when we have an entire grassland to ourselves and never even see another hunting party," said Bolton.

"It is really very incredible. In Iowa, I'm enjoying everything that royalty pays dearly for back home."

Lowell Washburn is an information specialist and photographer for the department.

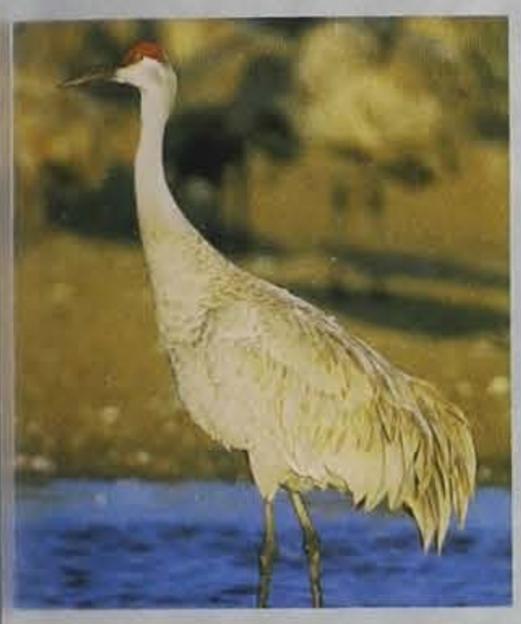
Share the Success

Help celebrate Iowa's conservation efforts.

The next *Conservationist* calendar will highlight 12 of Iowa's wildlife restoration success stories.

Normally a November/December special issue, this year 2000 calendar will be published as the July/August 1999 issue.

Look for it in your mailbox soon.



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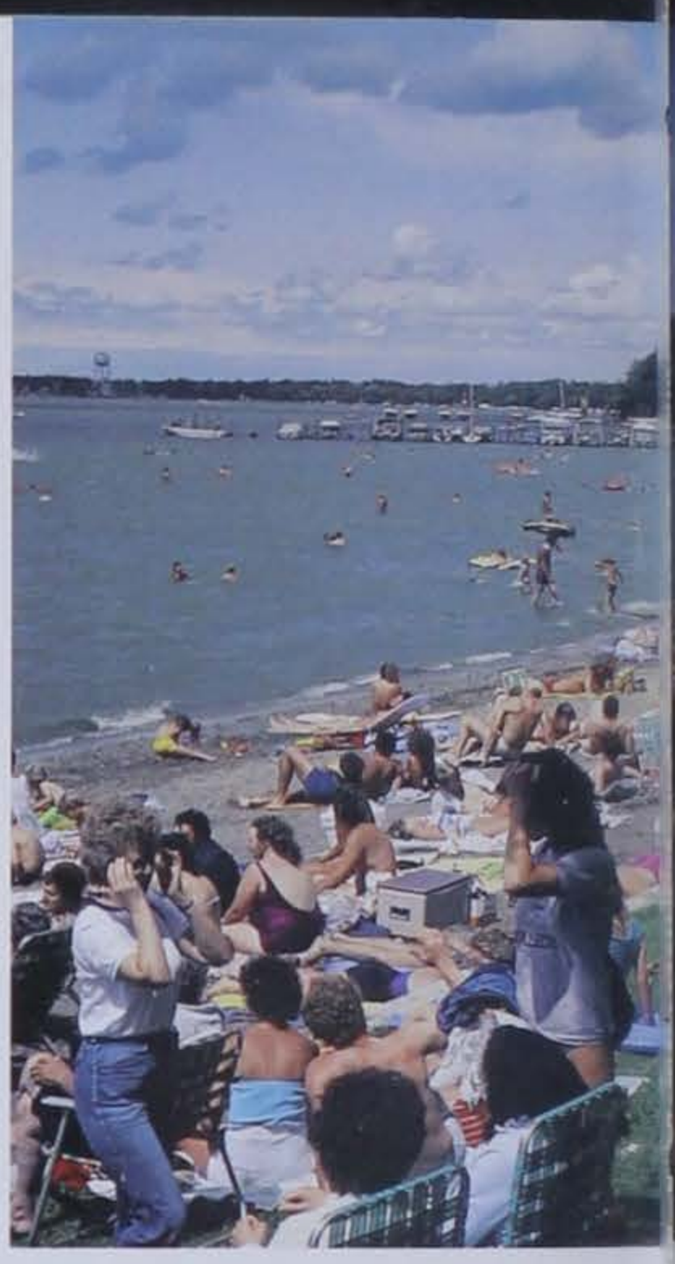
Jewel Of The North

Clear Lake State Park



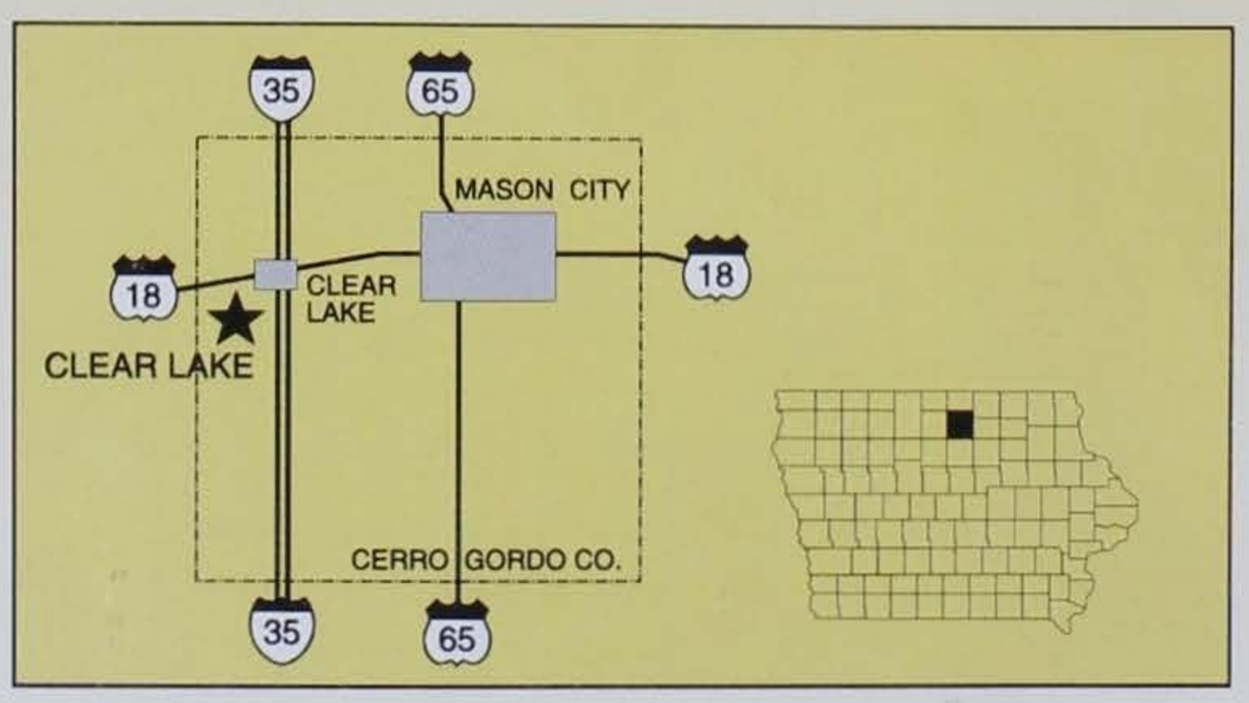
by Alan Foster
and Kirk Irwin

Nestled along the southeast shore of Clear Lake lies a jewel sparkling through the trees.

Granted, at 55 acres, Clear Lake State Park is a small jewel, given its environs. It could easily become lost in the expanse of Clear Lake, somewhere along the miles of shoreline surrounding the 3,600-acre lake, if not for its distinctiveness. When your next door neighbor is one of the major recreational features of northern Iowa, it's hard not to shine.

Clear Lake State Park, like so many other state parks, offers a wealth of recreational opportunities to its visitors. The campground, with 215 campsites, has been the second busiest camping attraction in the state park system. It provides most of the normal amenities sought by today's camper — handicap accessible modern rest rooms and showers, drinking water and a sanitary dump station.

For the camper preferring some of the more modern comforts of home, 95 of the campsites are equipped with 30-amp electrical hookups. The remaining sites are geared more for tent campers, open-flame chefs and those who like to "rough it."



DNR

On weekends, the Clear Lake beach is typically elbow to elbow.

A 900-foot concrete path running parallel to the beach is popular with walkers, joggers and bicyclists.

As part of the park's ecosystem management plan, a small woodland area located south of the open picnic shelter has been reverted to its natural state. It has become a prime location to view wildflowers during the spring and summer and wildlife throughout the year. Owls, squirrels, raccoons, opossums, an occasional deer and numerous songbirds frequent the area.

A variety of flowers, trees, shrubs, and prairie plants have recently been established in an area leased from Cerro Gordo County on the west side of the park. Additional trees and shrubs are planted throughout the park as needed. In addition, more than 150 oak trees were planted to celebrate Iowa's Sesquicentennial.

Handicap Accessible

Iowa has strived to ensure its state parks meet or exceed requirements set forth by the Americans with Disabilities Act (ADA). Clear Lake State Park, where two campsites and one picnic area are designated for physically handicapped visitors, is a good example of that effort. The shelter, rest room and showers facilities are ADA compliant.

The enclosed shelter, a product of he Works Progress Administration, has stood as a testament to the men and women who survived the Depression Area by working on Civilian Conservation Corp. and WPA work crews. However, 61 years of deterioration had taken its toll on the structure, and thanks to Iowa's Restore the Outdoors program, it received a facelift last year.

The shelter has become a popular choice for social, company and family gatherings, hosting more than 50 such events every summer. It features a fully-equipped kitchen, comfortable dining and lounge area and modern rest rooms. Spacious, it can accommodate up to 80 people in the main area and another 20 in the attached addition.

The picnic area, tucked away in a majestic oak stand, provides a shady place for families and friends to enjoy summertime meals while taking advantage of the usual picnic activities such as sailing Frisbees and playing volleyball and softball. Modern rest room and sanitary facilities are located nearby.

But the centerpiece of Clear Lake State Park, undoubtedly, is the beach.

Perhaps no area of Iowa is as synonymous with a season as Clear Lake State park and its 900-foot beach is with summer. For generations, the beach has been the definitive summer retreat in north-central Iowa. Sun seekers line the sand with giant beach towels and lounge chairs. Children splash in the shallow waters and build giant castles in the sand. Volleyball takes on a new twist when played in knee-deep water. Although the beach generally receives moderate usage on the weekdays, it's often elbow-to-elbow on the weekends.

The newly renovated shelter is spacious enough to accomodate nearly any social gathering.

DNR

DNR

Clear Lake hosts a myriad of celebrations throughout the year, including the occasional classic car show.

History

The history of Clear Lake State Park can be traced back to 1919, when a few local residents wrote the State Board of Conservation requesting land be set aside for a state park at Clear Lake. The first land purchase occurred in 1924, which included two beach-front lots and the area now used for picnicking. The remaining area of the present beach was obtained the following year. Another 20 acres, which became the campground, was acquired in 1964.

Woodford Island came under park management in 1971 when it was given to the Iowa Conservation Commission. In 1974, another parcel of land was bought and added to the campground.

Clear Lake is a natural lake evolving from the last glacial action 14,000 years ago. It is unique in that it is a high point of the surrounding landscape. In fact, the level of the lake is approximately the same height as neighboring Mason City's tallest building, the Brick & Tile. This unusual trait allows the lake to catch the summer winds needed to produce prime sailboating conditions. As a result, the lake hosts a number of regattas throughout the summer.

The Clear Lake community hosts a myriad of events and celebrations throughout the year, two of the more popular being the Fourth of July celebration and the Buddy Holly Tribute. The annual Fourth of July celebration, spanning several days, includes a large carnival and extensive parade. It is generally considered one of, if not the, biggest Fourth of July celebrations in the state. The Buddy Holly Tribute, also an annual event, draws music lovers from all over.

The Area Visitor's Guide, available through the Clear Lake Chamber of Commerce by calling 1-800-285-5338, details Clear Lake's community events.

Seasonal Opportunities

Clear Lake has been considered a prime outdoor recreational mecca since the first settlers arrived at the lake in covered wagons in 1851. Today, the recreational opportunities vary with the four seasons.

Spring is a great time to take a nature hike and witness the annual renewal of life which abounds during this season. Many public areas around the lake have awesome viewing opportunities at this time of year for waterfowl and other wildlife.

Summertime is for swimming and sunbathing at the public beaches. It's also a time for waterskiing, jetskiing, pleasure boating, wind surfing, sailing and parasailing on the lake.

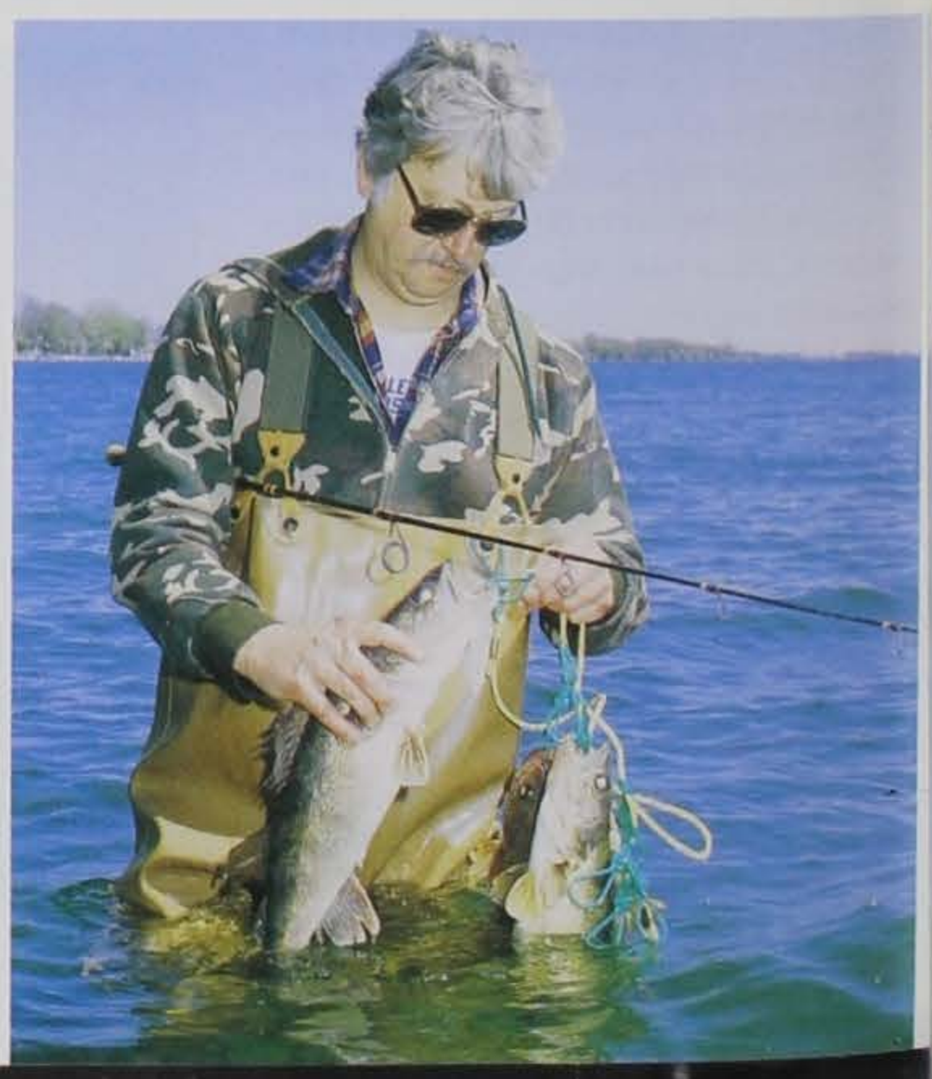
Fall is a good time to visit local marshes for outstanding wildlife viewin as well as superb waterfowl hunting. Good to excellent upland hunting is also available on most of the local wildlife areas.

Winter sports fanatics can ice fish, ice sail, snowmobile and cross-country ski. However, there are two marked aeration systems in use to enhance fish survival in Clear Lake which should be avoided for safety purposes.

Clear Lake is also a year around favorite of northwest Iowa anglers. It is best known for its walleye and yellow bass fisheries. Walleye in the 14- to 16-inch and 20- to 24-inch range were common in last year's fall surveys, and few spring rituals can rival the yellow bass run. Good populations of muskies, northern pike, bullheads, catfish, crappie and other panfish provide excellent angling throughout the year.

If it's action you're looking for or just a relaxing weekend away from home, give Clear Lake a try. You might just find that jewel you've been looking for.

Kirk Irwin is the park ranger at Clear Lake State Park.



Ron Johnson

Clear Lake is known for its walleye and yellow bass fishery, but also has good populations of other species.

Putting "Stock" in Iowa Farm Ponds

by Kay Hill

DNR

Stocking farm ponds at the right time and proper fish-per-acre ratio . . .

Farm ponds, although individually small in size, collectively contribute approximately 150,000 acres of fishing water in Iowa.

Each year the DNR fisheries bureau stocks nearly 800 acres of farm ponds. There is no cost to the pond owner to have the state stock the ponds, but the pond must meet the following requirements:

- New or renovated and free of fish
- Surface area of at least one-half acre
- Maximum depth of at least 8 feet
- Fenced to exclude livestock with a 60-foot minimum buffer between pond edge and fence.

The pond owner still controls access to the pond even if the fish were supplied by the DNR. The pond owner is under no obligation to allow public access to the pond.

However, the fisheries bureau provides free fish for private ponds because many pond owners often do allow other people to fish. Allowing angler access to farm ponds creates a positive economic impact. A study conducted by the fisheries bureau revealed each $1 spent stocking ponds generated $43 in fishing revenue, because each fishing trip has a monetary value.

If a pond owner needs fish and the pond meets the criteria, he or she should contact the local Natural Resources Conservation Service (NRCS) office and sign-up to receive fish. A DNR employee will contact the owner and arrange for an on-site inspection of the pond. This contact

DNR

. . . helps ensure quality fishing in the future.

Practical Conservationist

will allow the pond owner to obtain additional information concerning fish and wildlife management.

If the pond meets the minimum criteria, it will be approved for stocking. Owners of ponds approved for stocking will be notified by postcard at least 10 days prior to delivery of the fish. The card will indicate the date, time and location of delivery and the gallons of pond water needed by the pond owner to transport the fish.

Farm ponds are stocked with 750 to 1,000 bluegill fingerlings per acre, 100 two-inch channel catfish fingerlings per acre and 70 one-half-inch largemouth bass per acre. Bluegill and channel catfish are stocked in October and largemouth bass the following June. This split stocking system and the fish densities were determined from five years of pond stocking research.

Bluegills are stocked in the fall because the survival rate is higher due to lack of predation. They grow and mature sufficiently, enabling them to spawn the following June.

Largemouth bass are stocked when the bluegills are spawning to feed on the newly hatched fry, thereby controlling the bluegill population. These one-half-inch bass fingerlings can grow up to 12 inches the first summer due to the abundant bluegill forage base.

Research has shown largemouth bass have about a 50 percent mortality during the first year. Studies have also revealed first-year bass do not reproduce if their density is greater than 35 fish per acre. Bass need to reproduce in their second year of life so their newly hatched young can predate that year's bluegill reproduction. Therefore, to achieve 35 first-year bass per acre, one-half-inch largemouth bass are stocked at a 70 per acre ratio.

This stocking system provides consistent bass year classes which are needed to provide sufficient predation on young bluegills so the surviving grow to a large size.

DNR

Regulating largemouth bass harvest and stocking 8-inch channel catfish every three years will provide excellent fishing for decades.

Channel catfish are stocked in the fall along with bluegills, when no bass are present. This assures fish survival because small catfish are highly vulnerable to bass predation.

With the present stocking system, the farm ponds start with three species in the correct proportions and all three species grow rapidly enough to provide good fishing in about two years. If the pond owner regulates largemouth bass harvest and stocks 100 8-inch channel catfish per acre every three years, the pond will provide decades of excellent fishing for largemouth bass, bluegill and channel catfish.

When you want a super fishing trip, find a farm pond fenced to exclude livestock, back in a section, away from highly traveled roads. Inquire at adjacent farmsteads until you locate the pond owner, ask permission to fish and then hang on to your fishing rod because you'll catch lots of quality-sized fish.

DNR

One requirement for a pond to be stocked by the DNR is it must be fenced to exclude livestock.

Kay Hill is a fisheries research biologist at the southwest regional office at Cold Springs State Park in Lewis.

Gyotaku: Fish + Fabric = Fun

Article by A. Jay Winter
Photos by Clay Smith

Introduction:

Gyotaku (guh-yo-tah-koo) is the Japanese art of fish printing. Japanese sport fishermen would make prints of trophy fish they caught rather than have them mounted, in this way they could easily document the size and species of the fish they would catch. These prints would then be displayed or entered in contests. There have even been major gyotaku exhibitions held in New York.

Gyotaku is fun and educational for those who participate. Adults as well as youth get excited to show off their designs.

Procedure:

1. Gather all required materials for all participants.

2. Cover all surfaces with newspaper to protect from paint.

3. Place a piece of heavy paper in the middle of the table with a mound of paint on it.

4. If you are using T-shirts place cardboard in the shirt to avoid it from soaking from the front to the back.

5. Paint your fish, making sure to coat *all* parts *lightly*. If there are globs of paint or missed areas, they will appear on the finished product. Also, make sure there are no brush strokes as they will appear in the finished product.

Age

5 years and up

Length of Activity:

20 to 60 minutes

Materials:

cloth (t-shirts work well)
foam brushes
block ink, fabric ink or tempra paint (we use textile screening ink when working with fabric)
newspapers and paper towels to maintain and clean work area
printing materials: fish (either real or fake)

Objectives

Students will be able to
1. Identify fish anatomy and species through hands-on experience

Classroom Corner

Extensions

This can be extended with the following ideas:

-Use paper instead of cloth
-Use additional colors to add variety
-Use small plants and leaves to create habitat or a whole scene
-Use fabric markers to sign and date your art
-Create unique greeting cards, gift wrap, clothing, wall hangings, etc.

Sources

Fish replicas, ink, stamps, etc. are available from:

Nasco Arts and Crafts
901 Janesville Ave.
P.O. Box 901
Fort Atkinson, WI 53538-0901
Phone - 1-800-558-9595
Fax - (920)563 - 8296
www.nascofa.com

6. Place the fish on top of the shirt and make sure all parts of the fish have made adequate contact with the shirt (to do this press on all parts including all fins). Do not move the fish or look underneath before lifting it up as this will smear the finished product.

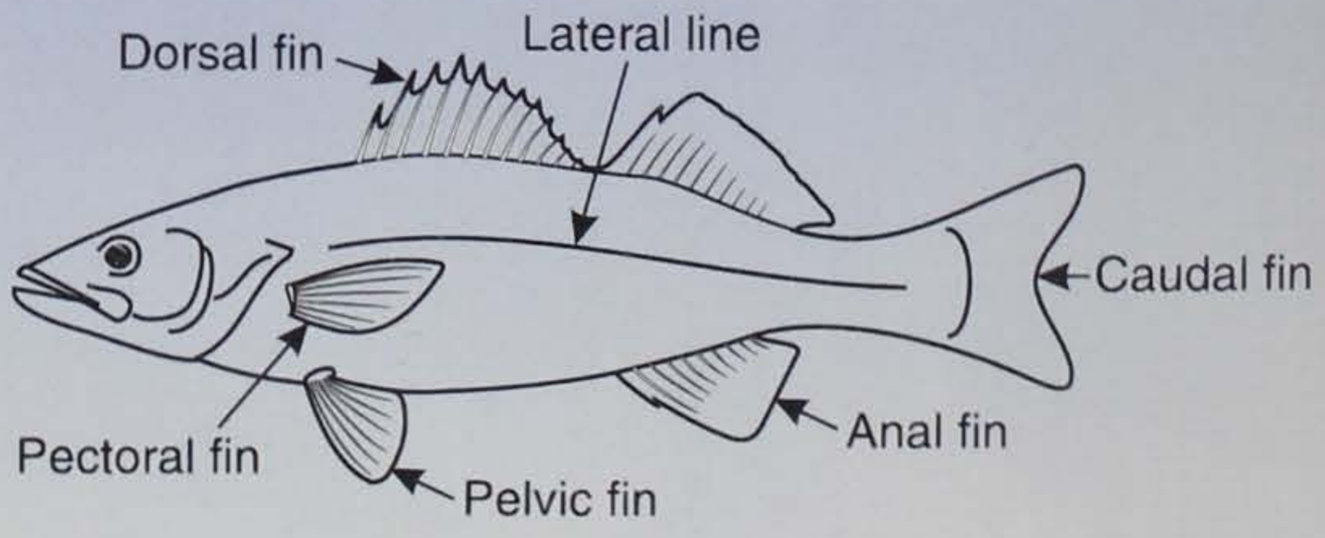
7. Pick the fish up and examine your work! You can *carefully* fill in missed areas with your paintbrush.

8. Continue with additional fish or other material.

Hint -- real fish are much easier to work with if they are frozen flat and washed with soap and water before use. This removes the protective slime layer and gives them definite shape.

A. Jay Winter is a training officer at the Springbrook Education Center.

Fish Anatomy



Conservation Update

Barb Gigar (L), DNR aquatic education program coordinator, presents Moulton Elementary School teacher Jean Ward with the 1999 Brass Bluegill Award.

Clay Smith

Moulton Teacher Receives 1999 Brass Bluegill Award

Jean Ward, a teacher at Moulton Elementary School in Des Moines, was awarded the "1999 Brass Bluegill" award for promoting fishing education in Iowa.

The award is presented annually to one educator in Iowa who promotes fishing as a lifetime skill through educational programs. Ward received the award for her work in the Moulton *Fish Iowa!* program, a school-based effort involving both students and the community in fishing education.

Fish Iowa! is a DNR program providing a module for schools to use as a teaching aid to promote fishing as a lifetime skill. The basics of conservation, safety and angling are covered through a variety of teaching aids.

Moulton is a year-round school located in an inner-city environment where *Fish Iowa!* is taught as part of an optional "Great Outdoor" unit during three-week breaks in the spring and fall. Fourth- and fifth-graders learn fishing facts, proper use of a rod and reel, how to tie on bobbers and hooks, how to identify fish and how to cast. Students also participated in a series of field trips to experience fishing near where they live. Interwoven in the course are several related lessons, including making Japanese fish prints and paper maché models, creating a fish rap song and learning to tie flies.

Ward has also worked with several local businesses to obtain materials for her program. Many fishing tackle vendors have provided equipment at discounted prices. Beaver Bait and Tackle in Johnston donated terminal tackle as well as technical assistance. Waterfront Seafood Market in Des Moines provided fish lunches to students following a tour of the restaurant. Ward has even donated personally to the program, providing lunch during field trips when a sit down meal isn't possible.

Ward has been involved in the *Fish Iowa!* program for the past four years and has incorporated material from the DNR's "Hooked on Fishing - Not on Drugs" program since its introduction in Iowa in the fall of 1996. She has involved parents and family members in the program, inviting them to assist during fishing events. Ward and a school mentor also take a group of at-risk boys on fishing outings in the spring and early summer, and she and her husband have taken parents and students on weekend fishing trips.

The Brass Bluegill Award was initiated in 1997 by the DNR Aquatic Education Program and Outdoor Technologies Group in Spirit Lake, the nation's largest fishing tackle manufacturer. The company also donated 24 spinning rods and reels to Moulton School.

East Monona Student Wins Boating Safety Poster Contest

Cassie Kunze, a sixth grader at East Monona Elementary School in Moorhead, took first place in the 1999 Boating and Water Safety Poster Contest.

The theme for this year's contest was "Personal Watercraft Safety." Kunze's poster was chosen from approximately 150 entries, according to Sonny Satre, DNR recreational safety coordinator. Second place went to Nicole Orth and third to Holly Wolff, both sixth grade students at James Madison Middle School in Burlington.

The annual contest, open to students in grades fourth through sixth, is conducted by the DNR in cooperation with the U.S. Coast Guard Auxiliary, Des Moines Power Squadron and the Midwest Water Safety Council. IMT Insurance, co-sponsor of the contest, provided cash prizes of $100 for first place, $50 for second and $25 for third.

Last year's winner was Ashley Gotto, also of East Monona school.

Conservation Update

Fishing Clinics, Tournaments Planned Across The State

A variety of fishing clinics and tournaments designed to teach the basics of fishing will be held across the state this summer, announced Barb Gigar, DNR aquatic education director.

The events are designed for novice anglers and will provide participants with beginning angling education and fishing opportunities. Educational material is provided by the DNR.

Following is a list of clinics and tournaments currently planned across the state. For more information, contact the event coordinator in your area at the number provided. If an event isn't listed in your area, contact your local county conservation board to see if an event has been scheduled.

Ken Formanek

County	Type of Event	Date	Location	Contact
Adams	Clinic/Youth	5/22	Lake Icaria, Corning	515/322-3442
Black Hawk	Clinic/Youth	6/21	Lake Manatt, Cedar Falls	319/277-2187
Black Hawk	Clinic/Youth	6/24	Lake Manatt, Cedar Falls	319/277-2187
Black Hawk	Clinic/Youth	7/14	Lake Manatt, Cedar Falls	319/277-2187
Black Hawk	Clinic/Youth	7/15	Lake Manatt, Cedar Falls	319/277-2187
Black Hawk	Clinic/Youth	7/19	Lake Manatt, Cedar Falls	319/277-2187
Black Hawk	Clinic/Youth	7/28	Lake Manatt, Cedar Falls	319/277-2187
Black Hawk	Clinic/All Ages	8/14	Lake Manatt, Cedar Falls	319/277-2187
Black Hawk	Clinic/Youth	8/21	Hickory Hills Co Park, La Porte City	319/342-3350
Carroll	Tournament/Youth	6/5	Swan Lake State Park, Carroll	712/792-4614
Carroll	Tournament/Seniors (over 55)	6/4	Swan Lake State Park, Carroll	712/792-4614
Cass	Clinic/Youth	6/5	Cold Springs Park, Lewis	712/243-3542
Cedar	Clinic/All Ages	7/31	Bennett Pond, Bennett	319/886/6930
Cerro Gordo	Clinic/Youth	6/5	McIntosh Woods State Park, Clear Lake	515/357-3517
Cerro Gordo	Clinic/Youth	6/7	Clear Lake	515/357-7010
Cherokee	Clinic/Youth	7/23	Martin Park Area, Larrabee	712/225-6709
Cherokee	Tournament/All Ages	6/5	Koser-Spring Lake Park, Cherokee	712/225-2715
Chickasaw	Clinic/Youth	6/4	Split Rock Park, Fredericksburg	515/394-4714
Chickasaw	Clinic/Youth	6/5	Air Port Lake, New Hampton	515/394-4714
Chickasaw	Clinic/Youth	6/6	Clear Lake Park, Nashua	515/394-4714
Clarke	Clinic/Youth	5/14	East Lake Park, Osceola	515/342-2783
Clarke	Clinic/Youth	5/17	East Lake Park, Osceola	515/342-2783
Clay	Clinic/All Ages	5/12	Stolleys Park, Spencer	712/993-5532
Clayton	Clinic/Youth	6/5	Osborne Pond, Elkader	319/245-1516
Crawford	Clinic/Youth	5/22	Yellow Smoke Park, Denison	712/263-3409
Crawford	Clinic/Youth	5/31	Nelsons Park, Dow City	712/263-3740
Crawford	Clinic/Youth	7/4	Yellow Smoke Park, Denison	712/263-3740
Davis	Clinic/Youth	6/5	McGowen Recreation Area, Bloomfield	515/664-2572
Dickinson	Tournament	6/5	Sawmill Park, Arnolds Park	712/933-5532
Dubuque	Clinic/Youth	6/5	Swiss Valley Park, Dubuque	319/556-6745

Conservation Update

Fayette	Tournament/Youth	6/5	Volga Lake, Fayette	319/422-3883
Floyd	Clinic/Youth	6/26	Elks Pond, Charles City	515/257-6214
Franklin	Clinic/Youth	6/5	Beeds Lake State Park, Hampton	515/456-4375
Greene	Clinic/Youth	6/13	Spring Lake State Park, Jefferson	515/386/5674
Guthrie	Girls Camp	6/10	Conservation Ed Center, Guthrie Center	515/747-8383
Guthrie	Girls Camp	7/29	Conservation Ed Center, Guthrie Center	515/747-8383
Guthrie	Women's Camp	9/10	Conservation Ed Center, Guthrie Center	515/747-8383
Hamilton	Tournament/ Family	6/6	Briggs Woods Lake, Webster City	515/832-4504
Hardin	Clinic/Youth	6/5	Meier Wildlife Refuge, Hubbard	515/648-9878
Hardin	Tournament/Youth	7/4	IA River, IA Falls	515/648-4775
Ida	Clinic/Youth	7/15	Moorehead Park, Ida Grove	712/364-3300
Iowa	Clinic/All Ages	5/22	Lake Iowa Park, Williamsburg	319/655-8466
Jackson	Clinic/All Ages	6/5	Andrew Jackson Demo. Farm, Andrew	319/652-3783
Jefferson	Clinic/Youth	6/6	Waterworks Park, Fairfield	515/472-8460
Jones	Clinic/Youth	6/5	Wapsipinicon State Park, Anamosa	319/462-2761
Marion	Clinic/Youth	6/5	Marion Co. Park, Knoxville	515/627-5935
Marion	Clinic/All Ages	6/6	Pleasantville City Park Pond, Pleasantville	515/848-5649
Monroe	Tournament/ All Ages	6/6	Miami Lake, Albia	515/946-8112
Muscatine	Clinic/Youth	6/5	Chicken Creek Saulsbury Rec., Muscatine	319/264-5922
Page	Clinic/Youth	6/5	Pioneer Lake, Shenandoah	712/246-5715
Palo Alto	Clinic/Youth	6/6	Lost Island Huston Park, Ruthven	712/837-4866
Plymouth	Clinic/All Ages	6/12	Hillview Recreation Area, Hinton	712/947-4270
Polk	Clinic/All Ages	5/27	Easter Lake Park, SE Des Moines	515/323-5300
Polk	Clinic/Seniors	6/4	Fort Des Moines Park, Des Moines	515/323-5300
Polk	Clinic/All Ages	6/12	Big Creek, Polk City	515/285-0959
Scott	Clinic/Youth	6/5	West Lake Park, Davenport	319/328-3281 ext. 24
Sioux	Clinic/Youth	6/25	Winterfield Area, Rock Valley	712/552-3057
Sioux	Clinic - special needs	8/20	Winterfield Area, Rock Valley	712/552-3057
Story	Tournament	5/8	Hickory Grove Park, Colo	515/232-2516
Story	Clinic/Youth	5/15	Izaak Walton League, Ames	515/232-2516
Story	Tournament/Youth	6/5	Hickory Grove Park, Colo	515/232-2516
Wapello	Clinic/All Ages	6/5	Ottumwa Park Lagoon, Ottumwa	515/682-3091
Warren	Clinic/Youth	6/5	Annett Nature Center, Indianola	515/961-6169 ext. 14
Washington	Clinic/Youth	6/5	Marr Park, Ainsworth	319/653-7765
Washington	Clinic - special needs	6/9	Marr Park, Ainsworth	319/653-7765
Washington	Clinic - special needs	6/9	Marr Park, Washington	319/694-2430
Wayne	Tournament/Youth	9/11	Bob White State Park, Allerton	515/873-4242
Webster	Clinic/Youth	5/22	Armstrong Park Pond, Fort Dodge	515/576-6323
Woodbury	Clinic/Youth	6/6	Browns Lake, Salix	712/233-1513

Olofson Shooting Range Now Open Weekdays

The DNR's Charles "Butch" Olofson Shooting Range has resumed normal summer operating hours, according to Sonny Satre, DNR recreational safety officer.

The range is now open Wednesdays through Sundays. Shooting hours for pistol, rifle, shotgun (shooting slugs) and bow and arrow are 10 a.m. to one-half hour before sunset. Trap and skeet ranges are open from noon to 8 p.m. Range hours are subject to change and shooters are advised to call the concession stand at 515-277-2523 or 515-795-3570. Current time schedules may also be obtained from the DNR at 515-281-8652.

Fees are $5 per round for trap and skeet shooting, handgun, shotgun (shooting slugs) and bow and arrow shooting are $4.50 per hour or any fraction of an hour. Organized hunter safety classes are $1 per hour or any fraction of an hour.

The range is located off Highway 415 one-half mile north of Polk City. Signs directing visitors to the range are posted along the highway.