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# Iowa CONSERVATIONIST

November 1991

Department of Natural Resources



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NOVEMBER 1991

VOLUME 50, NO. 11

## Iowa CONSERVATIONIST

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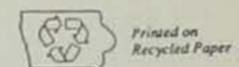
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Roger A. Hill

Biologists may be finding the answer to -- "What happened to the northern Iowa pheasants?"

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from  
**feast**  
to,  
famine

Pheasants flourished when first released in the northern portion of Iowa more than 90 years ago. By the mid 1920s, pheasants were so numerous in the northern Iowa that some farmers complained of crop damage. A decline in pheasant numbers in northern Iowa coincided with the spread of pheasants across the state. Hunters took advantage of the greater distribution and traveled to other parts of the state to pursue the brightly colored males each fall. Fewer hunters went to northern Iowa to hunt pheasants.

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by Terry Z. Riley, Paul A. Vohs and William R. Clark

Hand-held receivers, along with truck- and airplane-mounted receivers, locate hens and chicks. The necklace-type transmitters on hens and aspirin-sized transmitters implanted in the chicks send the locating signal. ►

Many biologists and hunters have speculated on the reasons for the decline in pheasant numbers in the north. Some think farming practices have reduced the quality and amount of nesting habitat and winter cover. Others feel heavy hunting pressure was responsible for the decline. Still others hold that the pheasants starved after a series of bad winters and just never recovered. We still speculate today by asking "What happened to the northern Iowa pheasants?" We may be on the road to the answer.

Iowa has a long history of pheasant research that began in Winnebago County in the 1930s and continued for more than 40 years. Most of the early work, conducted by Dr. Thomas S. Baskett and subsequent biologists, was accomplished on a small (1,400 acres) study area with limited money and technology. These studies have uncovered much concerning basic pheasant ecology, but little information was gained about how the pheasant reacts to changes in the environment through time.

In an attempt to fully understand how pheasants adapt to changes in the large landscape in which they live, pheasant researchers recently began a five-year study that would use the newest wildlife research techniques.

The initial objectives are to obtain a landscape view of survival and mortality of adult female pheasants during winter and spring and of young pheas-



Terry Z. Riley



Terry Z. Riley

ants (less than four weeks old) during spring and summer. The study is designed to contrast landscape differences on two large (20,000+ acres each) areas and to determine what features in the landscape affect pheasant survival. Electronic tracking from ground and air to get a "landscape" view of habitat use, and the use of miniature transmitters (about the weight of a dime) to monitor survival of day-old chicks makes this the first study of its kind on a major

upland gamebird.

Two areas in northern Iowa were selected for the study — one with intensive agriculture and limited cover, and the other with abundant cover and less intensive agriculture. One study area, in Kossuth County, is near the old Winnebago study area, because historical data is available and because pheasant populations have declined drastically in this area during the last 30 years. Because of its rich, well-drained soils,

this "flat" landscape with limited habitat is almost completely covered by corn and soybeans. The other area is in what biologists consider to be good pheasant habitat, in Clay and Palo Alto counties, approximately 40 miles southwest of the Kossuth site and at the same approximate latitude. Pheasant populations on the Clay/Palo Alto area historically have remained healthy and abundant. Poorly drained soils on the gently rolling landscape of this area have resulted

in a mixture of habitats including wetlands, idle grass fields (CRP), windbreaks and row crops.

Pheasant hens will be captured from September through March, using night lighting and bait trapping techniques. As the name implies, night-lighted birds are captured late at night in September and October using a truck equipped with flood lights and a spotlight. DNR personnel drive the specially equipped truck through likely roosting sites and capture the pheasants, using long-handled nets, as the birds attempt to run from the approaching lights. Bait traps are usually set during mid-winter when snow concentrates the birds in heavy cover. Radio transmitters are attached to captured hens and when the birds are released. The transmitter weighs about one-half ounce and is placed around the bird's neck, similar to a necklace. Hens are relocated by signals received via truck-mounted antennas and radio receivers to see how the birds distribute themselves over the landscape in an open winter, heavy snow cover and blizzards. Distribution and movement patterns of individual hens will be related to cover types and locations to determine which habitats are essential for survival and where mortality occurs. The role of windbreaks, CRP acres, ditches, roadsides, plowed fields and wetlands in relation to pheasant survival



Poor pheasant habitat. Typical of habitats found on intensively farmed areas found in Kossuth and Winnebago counties.



Good pheasant habitat. Typical of areas in Palo Alto and Clay counties where natural wetlands, idle fields, woodlots and small-grain fields are interspersed among row-crop fields.

will be evaluated with the aid of a computer mapping system.

Pheasant hens and chicks are relocated at regular intervals to determine if they are still alive and which habitats they are using. If they are dead, researchers try to determine the cause of death. If they cannot be located with the truck-mounted antenna and receiver, researchers use an airplane to search for the birds from the air. Once a bird has been located, researchers identify the bird's general activity, location, a cover-type used and time of day and immediately record the data on a small laptop computer.

Computer mapping is aiding

researchers in monitoring all large-scale changes in the landscape. Data from aerial photographs, airborne videotapes and satellite imagery are fed into the computer, and a baseline map is created on the computer screen. Technicians, using a sophisticated computer program, identify all fields, roads, wetlands and other landscape features. The final product is a color map biologists can use to identify any changes in the landscape. This information, together with the computer maps, is used to evaluate the habitat used by hen pheasants and their chicks, and to determine how effective hen pheas-

ants choices are regarding movement corridors, winter cover locations, escape routes and feeding habitat.

While it is essential for the hens to survive the winter, it is necessary for these hens to nest and raise young males for fall

determine which habitats are used during the first few weeks of life to determine where they feed and hide from predators. Chick survival will be related to movement patterns and habitat use. The effects on chick survival of heavy rainfall, cool and

1980s in Iowa might have been responsible for poor chick survival, and the wet springs of the 1990s might have wiped out many of our pheasant nests. The weather in northern Iowa over the last two years has been as predictable — unpredictable. The 1989-90 winter was "open" with little snow, but the 1990-91 winter had complete snow cover from early December through February and might be called an average Iowa winter. Spring rains were heavy in 1990 and 1991, but the rainfall patterns were much different between years. How successful pheasants are at selecting the various habitats available to them in winter and spring could mean life or death. Our ability to quantify these choices will mean improved management suggestions and practices.

We may never experience pheasant numbers similar to those of earlier years as human development and intensive agriculture have changed the landscape. However, it is the responsibility of the DNR to provide the best possible advice to its Iowans concerning the maintenance of its wildlife populations. We are fortunate that Iowa consistently produces more pheasants than nearly any other state, and by taking a birds-eye view of the landscape, Iowa will continue to be known for its pheasants and excellent fall pheasant hunting.

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*Terry Z. Riley is an upland wildlife research biologist with the Iowa Department of Natural Resources in Chariton.*

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*Paul A. Vohs is leader of the Iowa Cooperative Fish and Wildlife Unit at Iowa State University.*

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*William R. Clark is a professor in the Animal Ecology Department at Iowa State University.*



Roger A. Hill

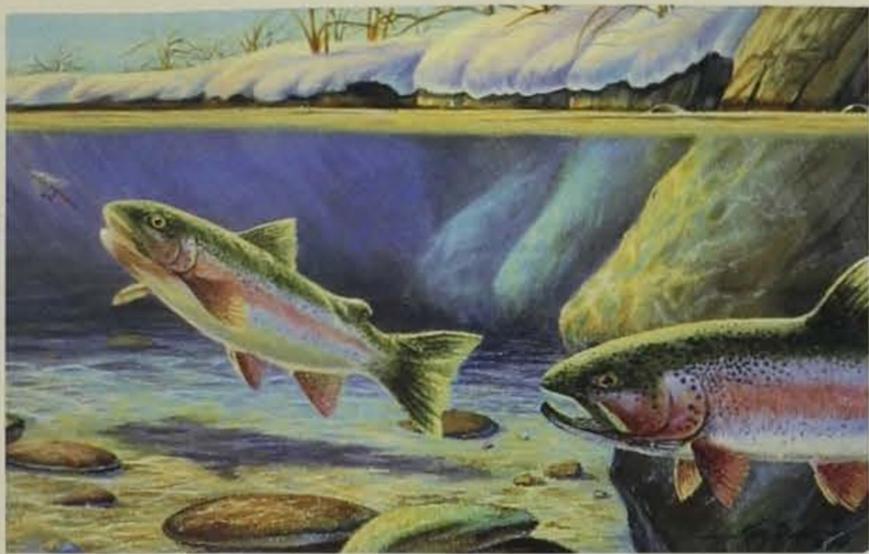
hunting and both young males and females to perpetuate the population. To determine the success of raising the chicks, day-old chicks are captured at or near the nest shortly after hatching. Radioed hens that survive the winter are monitored by radio signals through the spring to locate nests. After about 23 days of incubation, the hen changes her behavior as the eggs begin to hatch. This behavioral change causes the radio signal from the hen to fluctuate enough to alert researchers to the coming event. Within hours after hatching, several chicks are captured and equipped with small radio transmitters.

Transmitters are about the size of two aspirin tablets and are implanted under the skin between the shoulders on the back of the chick. After about an hour of recovery time the chicks are released back to the hen and the rest of her brood. Chicks weigh a little more than one-half ounce when they hatch and transmitters weigh about 1/28 of an ounce. Each hen and her chicks are relocated to

hot weather, and drought will be measured in relation to the habitats available in the landscape. From these evaluations researchers will be able to compare the lives and activities of the hens between the study areas and their choices in relation to survival.

Some might ask "Why are we spending more wildlife dollars to study pheasants? Why not just spend it to improve habitat?" It is important that wildlife managers know which habitat elements in the landscape enhance pheasant survival. Without a scientific data base managers might waste a tremendous amount of time and effort improving habitat without knowing whether their efforts were of benefit to pheasants. And, we might determine the most efficient placement of food plots, winter cover and windbreaks. Because of the varying annual weather conditions that occur in Iowa, several years will be needed to gather information for the data base to answer the habitat questions.

Iowa's weather is unpredictable and varies greatly from year to year. The droughts of the late



1992 Iowa Trout Stamp



1992 Iowa Habitat Stamp



1992 Iowa Duck Stamp

## TROUT STAMP HABITAT STAMP

For the second year, Missouri wildlife artist Kathy Dickson has been commissioned to design Iowa's Trout and Habitat stamps. Prints of these 1992 stamps are available from Treasured Scenes Artistry, P.O. Box 4085, Poplar Bluff, Missouri 63901, (314) 686-3360. The regular edition size of the trout stamp is 300 signed and numbered prints. The habitat stamp edition is 1,000 signed and numbered prints. Cost of the trout print with stamp is \$108 and the habitat print with stamp is available for \$105. Pencil remarks are an additional \$50 and color remarks are \$100.

## DUCK STAMP

Charlotte Edwards of Morse Bluff, Nebraska, was commissioned by Iowa Ducks Unlimited to design the 1992 Iowa Duck Stamp. Prints of the stamp will be sold as part of a DU Sponsor membership for \$200 beginning July 1, 1992. Sponsor memberships will be available at all DU banquets or by contacting the Iowa Ducks Unlimited Office, 106 E. Main, Lake Mills, Iowa 50450, (515) 592-3600. The edition size is 2,000 signed and numbered prints. An Iowa Duck Stamp is an additional \$5. Money from the sale of the DU sponsor prints goes towards wetland acquisition and restoration in Iowa.

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# Plans, Plants and Plantings

## ◆ Attracting Backyard Wildlife ◆

by Laura Spess Jackson

As our human population expands, more and more lands are altered to serve human needs. This expansion forces wildlife out of their former habitat. Consequently, it is becoming increasingly important to provide spaces where wildlife can live. Several measures can be taken to preserve wildlife habitat on urban and rural areas which will also provide direct benefits for landowners.

A row of conifers furnishes winter cover for wildlife and increases privacy around your home. Conifers can also act as a windbreak decreasing winter heating bills by as much as 35 percent. Hedges can supply nest sites and food sources for birds as well as a living fence for property borders. Plantings for wildlife can provide summer shade, autumn color, spring flowers and year-round wildlife viewing opportunities.

It is important to plan plantings, especially in a yard where space is limited. Be sure not to plant trees where they could interfere with powerlines or possibly harm buildings upon reaching maturity. If you have underground tiles, plant trees and shrubs far enough away so that extending roots do not damage the drainage system. In addition, maximize the benefits to wildlife by having plants which blossom and fruit at different times to provide a



Bruce Morrison

continuous source of food. A wide variety of shrubs and trees create a multiple-layered habitat, thereby providing for tree-top, shrub and grass dwelling wildlife at the same time.

It is a good idea to sketch your plans on a sheet of paper. Draw the plants at the size they will be at maturity. Often, you will find that there is not as much room for the number of plants that you originally wanted. Planning can save time and money you might otherwise have spent on unnecessary plants. If you plan to develop your backyard over several years, sketching your ideas will help you to remember where you wanted to place future plants. The plan on page nine is a suggested design for a "typical" backyard.

Wild birds and animals show preferences for certain areas or habitats. The wildlife you attract will depend not only on the type of habitat in your yard, but also on the habitat of the surrounding area.

Several types of habitats

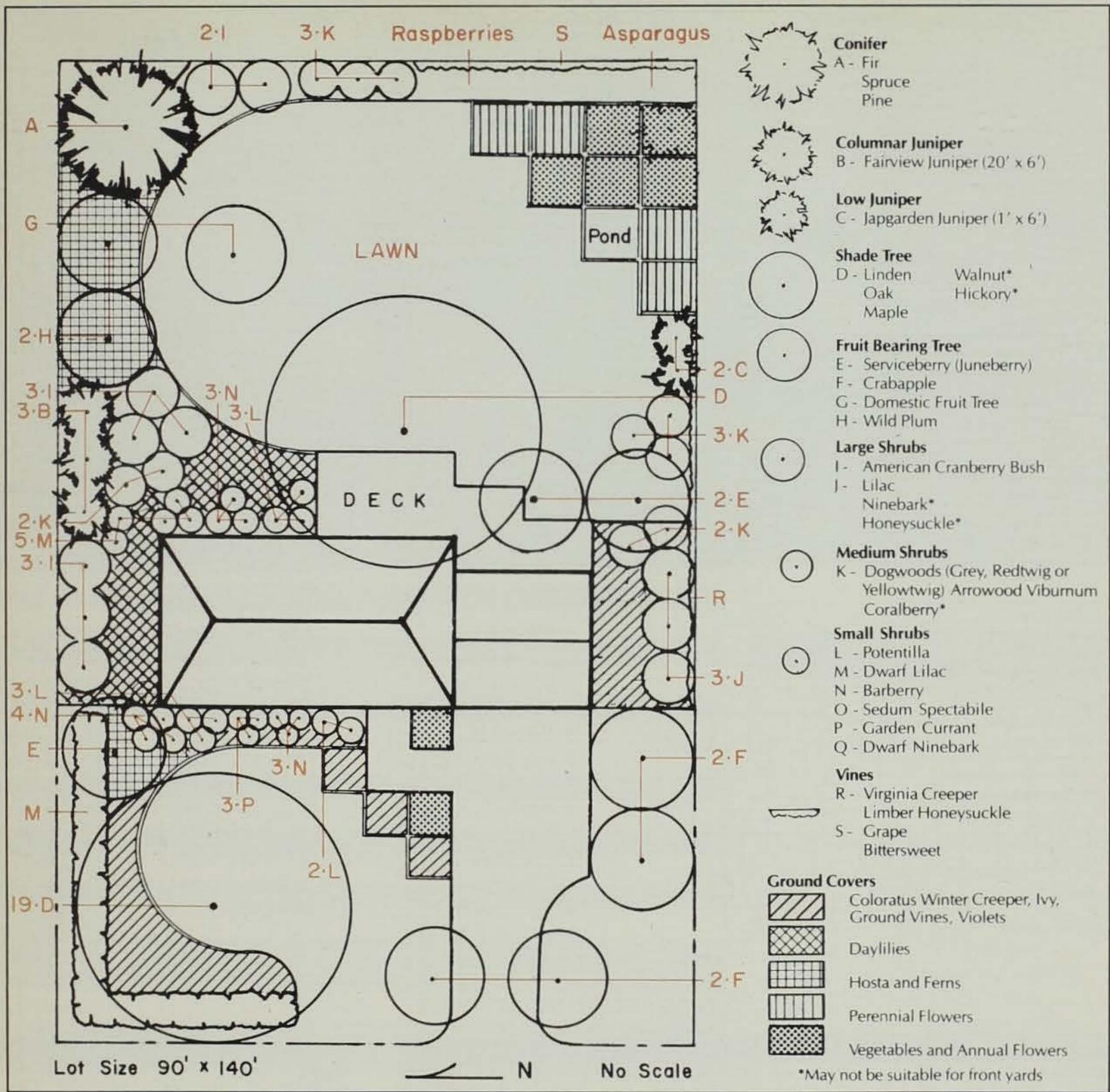
occur in Iowa -- including wetlands, grasslands, old fields, shrub forests, forest edges and mature forests. When planning your yard, it is best to harmonize the result you hope to create with the dominant type of habitat in your area. Eventually you can expect to see most or all of the wildlife species living within

the surrounding habitat in your yard.

Try to make the transition from a manicured lawn to mature trees gradual. Plant some low shrubs, tall shrubs and small trees to create an edge zone. Many wildlife species prefer these edge areas. Shrubs are particularly useful in edge plantings because they are intermediary zones between open grassland and mature forest. You can plant shrubs in most any situation to create an attractive area for wildlife.

It is usually best to plant trees and shrubs that provide food in addition to nest sites and protective cover. Most fruit- and nut-producing plants provide excellent wildlife food and nest sites. However, remember plants tend to grow best in certain locations. Match the vegetation you wish to plant with the soil type, mixture and acidity, and the amount of sunlight available in your yard. Ask your nursery for additional advice.

Evergreens, especially red cedar, spruces and firs are



important to wildlife in the winter. They provide sheltered refuges to protect wildlife from harsh winter winds and snow.

Wildlife and songbird packets, with selected seedlings can be ordered from the DNR's state forest nursery. See the 1991 Seedling Order Form on pages 10 and 11.

In addition to trees and shrubs, a small plot of native grasses in a generally open area will give a taste of the prairies

that once made Iowa part of the sea of grass. Prairie plants provide summer color, subtle fall hues of brown and red, and the lacy beauty of frosted winter plants, not to mention wildlife nesting and winter cover.

Vines are often overlooked when planning wildlife plantings. However, bittersweet, grapes and Virginia creeper can furnish food and cover for wildlife.

Flower beds or boxes can add other dimensions to your backyard by attracting butterflies, moths, bees and hummingbirds. Many flowers produce seeds that are eaten by birds.

*Laura Spess Jackson is a nongame biologist for the department in Boone.*

## To Help You Order

<b>Phone Orders</b>	For your convenience use our phone order system to order your plants. Just call the State Forest Nursery at 515/233-1161 to place your order. To FAX your order call 515/233-1131.
<b>Mail Orders</b>	To mail, send your order to State Forest Nursery, 2404 S. Duff, Ames, IA 50010.
<b>Payment</b>	For orders more than \$500, the nursery will bill you for 20 percent of the cost with the remainder to be paid by March 1, 1992. <b>DO NOT</b> send money with your order.
<b>Spring Delivery</b>	Spring orders are usually sent out during the month of April. Plants will be shipped via a state refrigerated truck to a drop-off point in each county.
<b>Claims</b>	Claims for any cause must be made within 10 days after receipt of plants. We give no warranty, expressed or implied, as to the productiveness or life of the material, and will not be in any way responsible for results or economic losses incurred or claimed by the customer.
<b>Restrictions</b>	The nursery stock must be planted and used for establishing or improving existing forest, erosion control, game or water conservation. These restrictions apply: These plants cannot be resold or given away with roots attached, to any person, firm, corporation or agency or planted for new windbreak, shade or ornamental purposes. All plantings must be protected from fire and domestic livestock grazing. All trees planted or used in violation of the above restrictions are subject to forfeit for destruction.
<b>Refunds</b>	No refunds after March 1.

### District Forester Addresses



1. Elkader .....	Box 662, 52043	(319) 245-1891
2. Charles City .....	Box 4, 50616	(515) 228-6611
3. Marshalltown .....	Box 681, 50158	(515) 752-3352
4. Anamosa .....	Box 46, 52205	(319) 462-2768
5. Wapello .....	515 Townsend Ave., 52653	(319) 523-8319
6. Fairfield .....	Box 568, 52556	(515) 472-2370
7. Chariton .....	Box 310, Route 2, 50049	(515) 774-4918
8. Adel .....	110 So. 8th, 50003	(515) 993-4133
9. Red Oak .....	Box 152, 51566	(712) 623-4252
10. Le Mars .....	1100A 12th St., S.W., 51031	(712) 546-5161
11. Creston .....	500 E. Taylor, 50801	(515) 782-6761
12. Humboldt .....	102 8th St., S., 50548	(515) 332-2761
State Forest Nursery .....		(515) 233-1161

### Suggested Spacing

Species	Reforestation	Wildlife	Erosion Control
Pines and other conifers	8' x 6' (908 plants/acre) for timber 6' x 6' (1,210 plants/acre) for Xmas Trees	same (High density makes good cover)	same
Walnut and other hardwoods	8' x 8' (681/acre) to 12' x 12' (302/acre)	8' x 8' (681/acre) to 16' x 16' (170/acre)	8' x 8' to 12' x 12'
Russian Olive		6' x 6' (1,210/acre) to 12' x 12'	same
Autumn Olive and other shrubs		3' to 5' between plants within rows; 5' to 10' between rows; range from 2,900 plants/acre (3' x 5') to 871 (5' x 10'). Or plant in clumps 4' x 4' or 6' x 6'.	

# Help Rebuild Our Forest Resource

To order by phone call 515/233-1161

**DNR 1992  
ORDER FORM**

Twenty percent down for orders more than \$500

## 1. Fill in the number-wanted column.

### PLANTS AVAILABLE

Wildlife and songbird packets can be ordered separately.

Packet		Cost/Packet	Code	Number of Packets
Wildlife	Contains 200 plants	\$35.00	96	
Songbird	Contains 20 plants	\$15.00	95	

	Height	Cost/Hundred	Code	Number of Plants
White Pine	8-14"	\$ 13.00	30	
Scotch Pine	8-14"	13.00	20	
Red Pine	8-14"	13.00	17	
Ponderosa Pine	6-12"	13.00	15	
Jack Pine	8-14"	13.00	10	
Red Cedar	6-14"	13.00	16	
Norway Spruce	8-14"	13.00	13	
White Spruce	8-14"	13.00	43	
Black Walnut	10-18"	20.00	24	
Black Walnut (top pruned)	10-18"	20.00	44	
Green Ash	8-18"	20.00	08	
White Ash	8-18"	20.00	28	
Silver Maple	8-18"	20.00	21	
Red Oak	8-14"	20.00	41	
Mixed Oak	6-14"	20.00	51	
Cottonwood	8"	20.00	83	
Hybrid Poplar (rooted cutting)	8"	20.00	53	
Russian Olive	8-16"	20.00	19	
Autumn Olive (Cardinal strain)	6-14"	20.00	03	
Amur Honeysuckle	8-16"	20.00	01	
Redosier Dogwood	8-18"	20.00	18	
Gray Dogwood	6-12"	20.00	07	
Common Lilac	6-12"	20.00	47	
Chokecherry	8-16"	20.00	39	
Wild Plum	10-18"	20.00	31	
Osage Orange	8-18"	20.00	14	
Ninebark	6-14"	20.00	12	
Siberian Crab	6-12"	20.00	46	
Nanking Cherry	8-16"	20.00	79	
Highbush Cranberry	6-12"	20.00	80	
Serviceberry	8-18"	20.00	78	

(Do not order less than 500 plants and order in units of 100)

To order by phone call 515/233-1161

To FAX your order call 515/233-1131

## 2. Address (Please Print)

(Landowner Name - Please Print)

(Mailing Address)

(City)

(State) (Zip)

(Area Code) (Phone Number)

## 3. Check One Box

I will pick up my order at the Nursery when notified.

Delivery to a drop-off point by refrigerated state truck. List county where seedlings are to be delivered.

County

## 4. Please Answer Each Question

1. These trees are to be planted in \_\_\_\_\_ County.

2. Did you purchase plants from the Nursery last year?

Yes

No

3. Where did you obtain this order form?

1. \_\_\_ District Forester
2. \_\_\_ Picked up or mailed from the Nursery
3. \_\_\_ County Conservation Board
4. \_\_\_ Other DNR Personnel
5. \_\_\_ Conservationist Magazine
6. \_\_\_ SCS or ASCS office
7. \_\_\_ County Extension Office
8. \_\_\_ Pheasants Forever
9. \_\_\_ Izaak Walton League
10. \_\_\_ Other

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1 year \$6

New

3 years \$12

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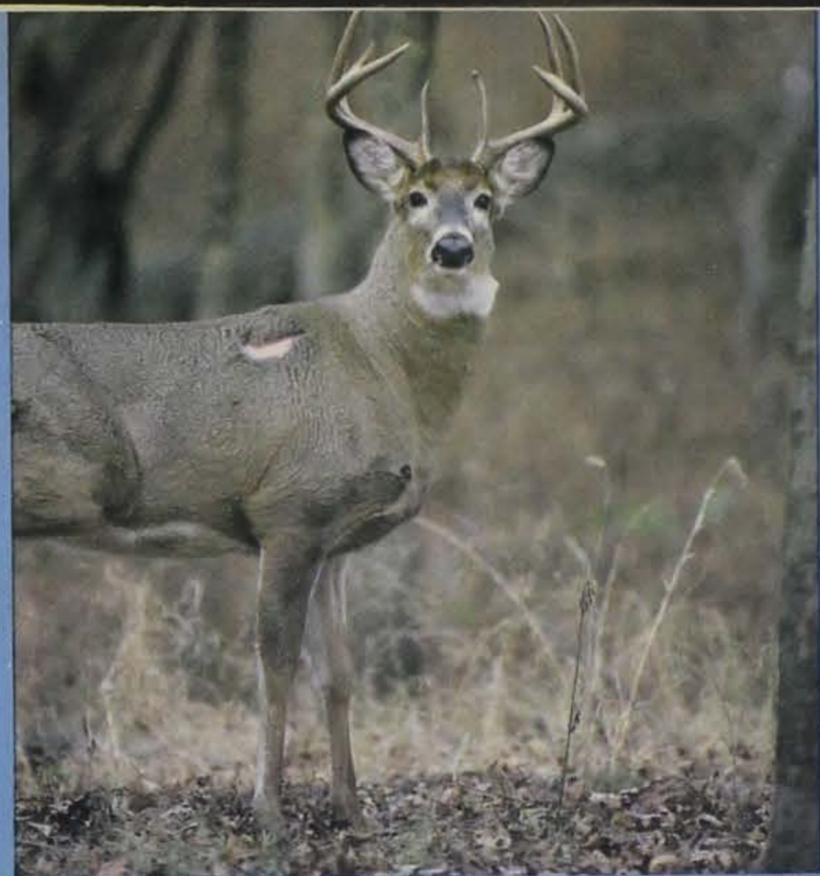
# 1991 RECORD DEER RACKS

This is a list of deer racks scored between October 1990 and September 1991. New entries into the *All-Time Top 10 Racks* are designated by an asterisk (\*).

Beginning this year, trophy deer taken by muzzleloader will be listed. If you have a trophy deer taken with a muzzleloader prior to 1990 that would qualify for the top 10 muzzleloader listing, please send a xerox copy of your score sheet to Lee Gladfelter, Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

## SHOTGUN TYPICAL (Minimum qualifying score -- 150 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
Ambrose Beck	Goose Lake	1990	Jackson	181-7/8
Rick Spencer	Corydon	1990	Wayne	180-7/8
Jeff Susic	Johnston	1990	Polk	179-3/8
Cleve Powell	Messina	1990	Adams	177-1/8
Roy Lindemier	Onslow	1990	Jackson	176-1/8
Mike Carolan	Springville	1989	Clayton	176
Dan Nicholson	Indianola	1990	Warren	174-7/8
Steve Smith	Dexter	1990	Madison	174-7/8
Craig Carpenter	Indianola	1990	Warren	174-3/8
Jim Jepsen	Correctionville	1990	Woodbury	173-1/8
Jerry Watts	Council Bluffs	1968	Harrison	173-1/8
Robert R. Morehead	Maquoketa	1990	Jackson	172-5/8
Larry McNeese	Albia	1990	Wapello	170-2/8
Dan McCullister	Williamsburg	1990	Iowa	170-2/8
J. Kevin King	Creston	1990	Madison	170-2/8
James L. Coyle	Cascade	1990	Jones	170
Bill C. Heine	Cedar Falls	1988	Bremer	168-5/8
Mike Noble	Wapello	1990	Louisa	168-5/8
George E. Scalf	Ottumwa	1990	Wapello	168-3/8
Keith Huber	Oelwein	1990	Winneshiek	168-2/8
Mike Griffis	Council Bluffs	1990	Union	168-1/8
Rodney Watson	Anita	1989	Cass	167-6/8
Scott Jacobsen	Welton	1989	Clinton	167-5/8
Matt S. Mundell	Ottumwa	1985	Wapello	167-3/8
Doug Cassaday	Independence	1990	Henry	167-1/8
Tom Jones	Oelwein	1987	Fayette	167
Jamie Wymore	New Market	1991	Taylor	166-6/8
Ron Poush	Chariton	1990	Lucas	166-5/8
Joe A. Stevey	Fairfield	1988	Jefferson	166-4/8
Dean Steger	Dyersville	1990	Clayton	166-3/8
C.D. Hunter	Mapleton	1980	Monona	166-2/8
Rex Hawn	Bedford	1968	Taylor	166-1/8
O. Scott DeShong	Des Moines	1990	Boone	166-1/8
Duane Reasnor	Ellston	1990		166-1/8
Charles Scott	Albia	1990	Monroe	165-6/8
Richard Nelson	Lenox	1990	Taylor	165-4/8
Bill White	Argyle	1989	Lee	165-3/8
Larry Whipple	Keokuk	1988	Lee	165
Randy Wolfe	Quasqueton	1990	Buchanan	164-5/8
Clayton C. Avenson	Ames	1989	Fayette	164-1/8
Tim Leonard	Newton	1989	Jasper	164
Dan Mullin	Centerville	1990	Appanoose	163-6/8
Dennis Reilly	Sidney	1990	Fremont	163-5/8
David Styles	Colesburg	1990	Clayton	163-5/8
Paul Seaton	Shellsburg	1990	Benton	163-2/8
John Bailey	Hedrick	1990	Keokuk	163-1/8
Tom Everham	Westfield	1990	Plymouth	163-1/8
Steve Brown	Strawberry Point	1989	Clayton	163
Stephen Salevsky, Jr.	Oskaloosa	1990	Mahaska	163
Paul Roberts	Eldon	1990	Wapello	163
Ron J. Stumpf	Riverside	1987	Washington	162-7/8
Larry Dixon	Fairbank	1988	Clayton	162-6/8
Rick Mahalakis	Dubuque	1990	Allamakee	162-5/8
Chad Hesseltine	Washington	1990	Washington	162-1/8
Robert Tickner, Jr.	Bridgewater	1989	Cass	162-1/8
Dennis Moore	Waterloo	1990	Allamakee	162
Dave Woodard	Oskaloosa	1990	Mahaska	1628
Steve Keller	Fairfield	1990	Jefferson	161-7/8
Jeff Wycoll	Ottumwa	1990	Wapello	161-3/8
Marty Carritt	Little Sioux	1990	Harrison	161-2/8



Chuck Doughty	Washington	1990	Washington	161-2/8
Curran J. Smothers	Dubuque	1990	Dubuque	161-2/8
Ronald Buckley	Bussey	1987	Marion	161
Neal Frary	Salem	1990	Henry	160-7/8
Rick Long	Burlington	1990	Henry	160-6/8
Jeff J. Parkison	Cedar Rapids	1990	Jefferson	160-5/8
John Bockes	Wapello	1990	Henry	160-3/8
Jeff Thompson	Greenfield	1990	Madison	160-2/8
Ed Sirdoreus	Fairfield	1990	Jefferson	160-1/8
Al Thayer	Hartford	1990	Appanoose	159-7/8
Rick Hugdahl	Ames	1990	Story	159-5/8
Scott Strong	Grinnell	1990	Poweshiek	159-4/8
Jeff Koranda	Cedar Rapids	1990	Clayton	159-3/8
Phil Guy	Brighton	1990	Washington	159-2/8
Steve Smith	Moravia	1990	Appanoose	159-2/8
Darrell Frazier	Ottumwa	1990	Davis	159
Dan J. Adams	Osage	1988	Mitchell	159
Glen Lueders	Clinton	1988	Chickasaw	158-7/8
Larry Mullenax	DeSoto	1990	Dallas	158-7/8
Rob Harrison	Sioux City	1990	Ida	158-6/8
Joe Lauber	Clarinda	1990	Page	158-6/8
Albert G. Newton	Iowa City	1990	Monroe	158-5/8
John Hockspeter	Alta Vista	1990	Allamakee	158-5/8
Robert Bloodsworth	Oskaloosa	1989	Mahaska	158-5/8
Rick Koob	Humboldt	1985	Humboldt	158-4/8
Gary Schilling	Hopkinton	1979	Delaware	158-4/8
Carl Purvis	Guernsey	1984	Appanoose	158-2/8
Jerry G. Newton	Charles City	1975	Lucas	158-1/8
Duane Ellis	LaPorte City	1990	Wapello	157-7/8
Earl Purvis	Marshalltown	1990	Appanoose	157-7/8
Max Lowenberg	Afton	1990	Union	157-4/8
Pat Cota	Harpers Ferry	1989	Allamakee	157-3/8
Walter Penhollow	Oelwein	1981	Clayton	157-2/8
Larry Williams	Alburnett	1990	Jones	157-2/8
Bruce Pettyjohn	Hamilton	1990	Marion	157-1/8
Joe Ream	Unionville	1990	Lucas	157-1/8
Peter Halverson	Clear Lake	1990	Winnebago	157
Rod A. Emery	Waterloo	1988	Black Hawk	157
Steve Rus	Tracy	1990	Marion	157
John Schumate	Dunlap	1984	Crawford	157
Norm E. Hirschy	New London	1971	Henry	156-6/8
Ed Walleser	Lansing	1990	Allamakee	156-6/8
Marc Vander Will	New Sharon	1990	Mahaska	156-6/8
Jim McInteer	Wever	1988	Van Buren	156-5/8
Tom L. Overman	Belle Plaine	1990	Tama	156-3/8
Allen Bushman	Council Bluffs	1990	Mills	156-2/8
Fred Scott	Sharpsburg	1990	Taylor	156-2/8
Tom Thomson	Sperry	1989	Des Moines	155-7/8
Scott Lundy	Greenfield	1989	Adair	155-6/8
Dennis Annis	Corydon	1990	Wayne	155-6/8
Arnold Gardner	Riverton		Fremont	155-5/8
Bob Adam	Fairfield	1984	Jefferson	155-4/8
Duane Jager	Eddyville	1990	Wapello	155-3/8
Gary L. Bix, Jr.	Ottumwa	1990	Davis	155-2/8
Rick Koob	Humboldt	1990	Humboldt	155-2/8
Wes Perkins	Allerton	1989	Wayne	155
Shawn Hathaway	Remsen	1990	Monona	155
Bryan Heebner	Estherville	1990	Dickinson	155
Marty Mardesen	Wiota	1990	Cass	154-7/8
Rob Riggen	Tracy	1990	Marion	154-6/8
Dan Junek	Sioux City	1990	Henry	154-5/8
Steve Miller	Forest City	1987	Hancock	154-5/8
Kevin Thompson	Maxwell	1985	Jasper	154-5/8
Jon Green	Prescott	1990	Adair	154-5/8
Lawrence E. Merrick	Albia	1990	Monroe	154-4/8

Dave Bublitz	Marion	1989	Allamakee	154-4/8
Dan Stangler	Mason City	1990	Allamakee	154-4/8
Dave Downs	Toledo	1990	Marshall	154-4/8
Mike Sims	Russell	1990	Lucas	154-4/8
Jerry Watts	Council Bluffs	1960	Pottawattamie	154-3/8
Ryan Mills	Russell	1990	Lucas	154-2/8
Dan Bush	Winterset	1988	Madison	154-2/8
Steve Huff	Knoxville	1990	Monroe	154-2/8
Terry Varner	Cedar Rapids	1990	Jasper	154-2/8
Duayne Buescher	Sperry	1990	Des Moines	154
Greg De Reus	Oskaloosa	1990	Mahaska	154
Brad Hornung	Montröse	1988	Lee	153-7/8
John Watts	Ottumwa	1990	Davis	153-7/8
Chad R. Harbaugh	Guttenberg	1990	Clayton	153-6/8
Roger Stuart	Altoona	1990	Polk	153-5/8
Rick Ruble	Lucas	1989	Wayne	153-4/8
Danny Brown	Oskaloosa	1988	Mahaska	153-3/8
Willis Lueders	Clinton	1984	Davis	153-2/8
Dave Drake	Bayard	1990	Guthrie	153-2/8
John L. Jamison	Wiota	1990	Cass	153-2/8
Roland Breeser	Decorah	1990	Winneshiek	153-2/8
Bob Self	Moravia	1990	Appanoose	153-2/8
Matt Harper	Lorimor	1990	Union	153-1/8
Bill Dougherty	Bedford		Taylor	153
Roy Ackelson	Des Moines	1990	Madison	152-7/8
Steve Hillers	Manchester	1990	Delaware	152-4/8
Gerald Marshall	Numa	1989	Appanoose	152-4/8
Kevin Ingles	Toddville	1988	Allamakee	152-4/8
Jason Owens	Runnells	1990	Marion	152-4/8
Brett Slaubaugh	Richland	1990	Keokuk	152-3/8
Randy Hemrich	Masonville	1988	Delaware	152-1/8
Tom Fry	Oscola	1990	Decatur	151-4/8
Tim Mohlis	Oelwein	1990	Fayette	151-4/8
Ted Hoover	Ottumwa	1989	Wapello	151-4/8
Ted Rake	Wall Lake	1990	Monona	151-4/8
Larry W. Adam	Bonaparte	1990	Van Buren	151-3/8
Darryl Steeve	Indianola	1989	Warren	151-3/8
Greg Duinink	Delhi	1990	Marion	151-2/8
Kurt Walderbach	Mason City	1990	Decatur	151-2/8
Jeffrey S. Clark	New Market	1990		151-1/8
Eugene Dillenbürg	ML. Ayr	1990	Ringgold	151
Tony Richenberger	Burlington	1990	Henry	151
Tony Rebarcak	Eddyville	1990	Monroe	151
Harold Morgan	Waterloo	1985	Woodbury	150-7/8
Larry Roberts	Ottumwa	1990	Wapello	150-5/8
Mike Roberts	Bloomfield	1990	Davis	150-5/8
Paul Magnussen	Millford	1961	Cherokee	150-3/8
Ayron Teeter	Moulton	1990	Appanoose	150-3/8
Dean E. Jackson	Coon Rapids	1989	Guthrie	150-2/8
Don Malven	Council Bluffs	1990	Harrison	150-2/8
Gould K. Miller	Moulton	1990	Appanoose	150-2/8
Jack Bensink	Pleasantville	1990	Marion	150-2/8
Paul Horak	Columbus Jct.	1990	Louisa	150-2/8
Chuck Moon	Chariton	1990	Lucas	150-1/8
Jon Neis	Ottumwa	1990	Wapello	150

**SHOTGUN NONTYPICAL**  
(Minimum qualifying score -- 170 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Larry J. Caldwell	Des Moines	1990	Warren	250-2/8
*Ed Stivard	Burlington	1990	Des Moines	227-6/8
Duane Cahoy	Fredericksburg	1990	Fayette	225-2/8
Mike Laux	Fairfield	1990	Jefferson	220-5/8
Clem A. Herman	Mason City	1990	Appanoose	203-4/8
Wayne McClain	Keokuk	1980	Lee	203
Dan Gallagher	Alburnett	1989	Allamakee	201-4/8
Brian Reinier	Ottumwa	1990	Wapello	198-6/8
Grant Saunders	Ogden	1990	Boone	197-4/8
Dennis Bahr	Waukon	1990	Allamakee	197
David Jorgensen	Preston	1990	Jackson	196-4/8
Terry D. Freese	Dubuque	1990	Dubuque	196
Duane Blades	Mt. Ayr	1990	Ringgold	193-3/8
Ray Schafer	Eldon	1990	Davis	192-2/8
Tim Phipps	Pilot Mound	1989	Boone	190
Joseph H. Millmeyer	Fl. Madison	1990	Lee	189-3/8
William Gross	Dubuque	1990	Van Buren	188-7/8
Neil J. McGee	Cedar Rapids	1990	Wapello	187-5/8
N. William Porter	Waukeé	1990	Warren	186
Chud Frantum	Jamaica	1990	Guthrie	185-7/8
Jim Brand	Mt. Ayr	1990	Ringgold	183-4/8
Tim Mitchell	Fayette	1990	Fayette	182-5/8
Guy Richardson	Whiting	1990	Monona	182
Dean Nolting	Preston	1990	Jackson	181-7/8
Joseph Johnson	Moulton	1990	Davis	181-6/8
Kent Cook	Fairfield	1989	Jefferson	180-3/8
Richard Pauley	Mystic	1990	Appanoose	180-1/8
Micheal Fisher	Baxter	1990	Jasper	179-3/8
Larry Blum	Washington	1990	Washington	179-1/8
Dave Hall	Waterloo	1990		178-7/8
Jim Cupples	Newton	1990	Marion	178-4/8
Neil McGee	Cedar Rapids	1979	Monroe	178-2/8
Al Gossling	Ossian	1990	Fayette	178-1/8
Richard Triska	Salem	1990	Henry	176-4/8
Clete Swackhamer	Cincinnati	1990	Appanoose	175-6/8
Jeff Davis	Maquoketa	1990	Jackson	174-5/8

Gordon Klemme	Akron	1990	Plymouth	173-5/8
Jim Yates	Humeston	1990	Lucas	173-4/8
Bill Lang	Decorah	1978	Winneshiek	172-7/8
Kelly Salow	Earlville		Iowa	172-2/8

**MUZZLELOADER TYPICAL**  
(Minimum qualify score -- 150 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Jerry Conover	Sioux City	1990	Monona	182-7/8
*David Hammel	Dorchester	1990	Allamakee	166-1/8
*Dale Clayton	Glenwood	1990	Mills	164-1/8
*Dennis DeVries	Pella	1990	Marion	162-7/8
Butch Caylor	Chariton	1991	Lucas	161-6/8
Rusty Emery	New Hampton	1990	Winneshiek	161-1/8
Duane Krominga	Hopkinton	1990	Delaware	154-4/8
Randy Carstens	Castana	1990	Monona	154-4/8
Doug L. White	Ames	1989	Marion	153-5/8
Bruce Heishman	Norway	1990	Iowa	153-4/8
Al Thayer	Hartford	1990	Decatur	152-7/8
Richard Pauley	Mystic	1990	Appanoose	151-4/8
Douglas Gallerick	Donnellson	1990	Lee	151-2/8
Martin Hauenstein	Oskaloosa	1990	Marion	150-4/8
Randy Archer	Whitting	1990	Monona	150-3/8
Leroy Rummelhart	Corahville	1991	Washington	150-3/8
Mike Borwig	Swisher	1990	Allamakee	150
Dennis Prottzman	Mt. Pleasant	1990	Henry	150

**MUZZLELOADER NONTYPICAL**  
(Minimum qualifying score -- 170 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Mike Moody	Hamburg	1990	Fremont	210-2/8
*Vince Jauron	Harlan	1990	Monona	209-1/8
*Nathan Giddings	Morrison	1990	Jackson	188-1/8
*Pete Sanford	Oscola	1990	Clarke	181
*Craig Cretsinger	Spencer	1990	Clay	174-7/8

**BOW AND ARROW TYPICAL**  
(Minimum qualifying score -- 135 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Rodney Hommer	Woodburn	1990	Clarke	179-4/8
*Ronald A. Murphy	Kalona	1990	Washington	178-7/8
Doug McKeenan	Montrose	1989	Lee	175
Gary Maatsch	Pomeroy	1990	Adams	171-2/8
Matthew Modeland	Forest City	1990	Winnebago	170-1/8
Jim Ortel	Ventura	1990	Winnebago	168-5/8
Steven L. Reighard, Sr.	Estherville	1990	Emmett	164-6/8
Dwight Engleén	Slater	1986	Boone	163-1/8
Greg Summers	Lehigh	1987	Webster	162
Jim Francois	Dubuque	1990	Van Buren	161-4/8
Mark A. Hedum	Marshalltown	1990	Marshall	158-7/8
Mike Smith	Missouri Valley	1989	Pottawattamie	158-7/8
Michael R. Selover	Des Moines	1988	Guthrie	158-1/8
Jan Hook	Cedar Falls	1989	Bremer	158
Ron Hansen	Dows	1990	Franklin	156-7/8
Tim Waldron	Council Bluffs	1990	Pottawattamie	156-4/8
Don Weber	Staceyville	1990	Mitchell	156-2/8
John W. Breitbart	Evansdale	1989	Bremer	155-7/8
Pat Stallman	Norway	1988	Des Moines	155-6/8
Larry Johns	Ottumwa	1990	Wapello	155
Todd Cruchelow	Clive	1990	Warren	154-6/8
David Steffens	Mt. Pleasant	1991	Henry	154-4/8
Cameron Williams	New Market	1988	Pottawattamie	153-6/8
Gene Sacco	Centerville	1990	Appanoose	153-6/8
Roger McDowell	Mt. Pleasant	1990	Jefferson	153-4/8
Dennis L. Weber	Cedar Rapids	1990	Allamakee	152-2/8
Phil Ginkens	Mt. Pleasant	1990	Henry	151-7/8
Glen Garnett	Scranton	1990	Greene	151-6/8
Roger McDowell	Mt. Pleasant	1990	Henry	151-6/8
Marlin Derby	Brighton	1990	Washington	151-5/8
Todd Susie	Cushing	1990	Monona	151-4/8
Robert C. Unga	Manchester	1990	Clayton	151-3/8
Jerry Pitsney	Swisher	1990	Iowa	151
Clayton Eakins	Bloomfield	1990	Davis	151
Darrell Promes	Gowrie	1990	Webster	150-6/8
David Hotz	Cedar Rapids	1990	Linn	150-6/8
Matt Anderson	Ft. Dodge	1989	Webster	150-5/8
Steve Scharnweber	Boone	1989	Boone	150-4/8
Rod Heldemann	Waverly	1990	Bremer	150-2/8
Larry H. Thurman	Blue Grass	1990	Louisa	150-1/8
Michael A. Hazen	Muscatine	1990	Louisa	150
Charles Thornton	Carlisle	1989	Warren	150
Shane Fee	Beacon	1990	Mahaska	149-6/8
Mike Barker	Oelwein	1989	Fayette	149-5/8
Douglas J. Peterson	Clinton	1985	Clinton	149-5/8
Gary Swoveland	Waterloo	1988	Black Hawk	149-5/8
Ted Harbour	Blakesburg	1990	Wapello	148-6/8
E.J. Founroin	Seymour	1966	Benton	148-4/8
Craig Cornelius	Waterloo	1989	Black Hawk	148-2/8
Gary W. Gilkison	Davenport	1988	Scott	147-7/8
Kevin Sweeney	Dubuque	1990	Allamakee	147-7/8
Connie Pherigo	Newton	1990	Wayne	147-4/8

Robert McDowell	Ottumwa	1990	Davis	147-3/8
Brian Long	Ottumwa	1990	Wapello	147-2/8
Jeremy Howard	Carlisle	1990	Warren	147-1/8
Larry Caldwell	Des Moines	1989	Warren	147
George R. Briggs	Lisbon	1990	Cedar	146-5/8
Wayne McClain	Keokuk	1985	Lee	146-3/8
Thomas Joyner, Jr.	La Porte City	1990	Fayette	146-2/8
Wes Perkins	Allerton	1988	Wayne	146-2/8
Steve Dilling	Des Moines		Wayne	145-4/8
Ronald Post	Dubuque	1990	Jones	145-1/8
Tom Starns	Albia	1989	Monroe	145-1/8
Bill Durham	Swan	1990	Warren	145
John Bantz	Glenwood	1990	Mills	144-7/8
Jim Kerns	Edgewood	1989	Clayton	144-6/8
Tim A. Waid	Fayette	1990	Allamakee	144-6/8
Rex Jones	Ottumwa	1990	Wapello	144-5/8
Frank Delouts	Numa	1990	Appanoose	144-4/8
Terry Hinegardner	Montour	1989	Tama	144
Dave Young	Ottumwa	1990		144
Dean Zach	Central City	1990	Johnson	143-7/8
Charles Peters	Palmer	1990	Palo Alto	143-5/8
T. J. Colburn	Evansdale	1990	Chickasaw	142-5/8
Patrick Salmen	Sioux City	1990	Monona	142-3/8
Richard A. Preston	Guttenberg	1990	Clayton	142-2/8
Dean Zach	Central City	1981	Johnson	142-2/8
Robert Johnson	Ames	1989	Boone	142-1/8
Ken Klein	Iowa City	1990	Johnson	142-1/8
Ronald Sullwell	Lawton	1990	Woodbury	142-1/8
Garry Jurgenson	Sumner	1988	Bremer	141-6/8
Dan Yuska	Traer	1990	Tama	141-5/8
Pat Boyle	Danbury	1989	Monona	141-4/8
Daniel R. Wilson	Blakesburg	1988	Monroe	141-3/8
Rusty Corder	Unionville	1990	Appanoose	141-2/8
Dan Berry	Winterset	1990	Madison	141-2/8
Arlynn Ahrens	Hampton	1990	Franklin	141
Ed Stevens	Killduff	1990	Jasper	140-4/8
Shawn Smith	Oxford	1988	Johnson	140-2/8
Matt Fox	Paton	1990	Greene	140
John Johnson	Clio	1989	Wayne	139-3/8
Steve Maher	Essex	1988	Fremont	139-2/8
Scott McLaury	Hazleton	1989	Delaware	138-2/8
Jim Buffum	Council Bluffs	1990	Pottawattamie	138-1/8
Peter Helton	Bedford	1990	Taylor	138-1/8
Jerry Watts	Council Bluffs	1963	Pottawattamie	138
Mike Carter	New London	1990	Des Moines	137-6/8
Bob Becker	Manchester	1990	Delaware	137-3/8
Harold Barnes	Eddyville	1990	Wapello	137-3/8
Jerry Sickles	Mt. Ayr	1990	Ringgold	137-3/8
Steve Cox	Albia	1990	Monroe	137-2/8
Jeff Nelson	Goldfield	1990	Wright	137-2/8
Mike McBride	Sioux City	1990	Woodbury	137-1/8
Ed Smith	Mt. Pleasant	1990	Jefferson	137-1/8
Jimmy Roe	Eddyville	1990	Mahaska	136-6/8
Jim Wages	West Point	1990	Lee	136-6/8
Mark Horton	Akron	1990	Plymouth	136-4/8
Cal Yorgensen	Cedar Rapids	1990	Linn	136-2/8
Tim Bacon	Ft. Dodge	1990	Webster	136
Eric Burns	Prairie City	1990	Marion	136
Larry Lee Cavanaugh	Ft. Madison	1988	Des Moines	135-6/8
Ron Bitting	Clarinda	1989	Page	135-5/8
Duane Albrecht	Woodward	1989	Dallas	135-4/8
Terry Guffy	Sioux City	1990	Woodbury	135-4/8
Tim Andreson	Galva	1990	Monona	135-4/8
Andy Merritt	Seymour	1990	Wayne	135-4/8
Bill Wiebe	Boone	1990	Boone	135-4/8
Mike Krier	Ollie	1989	Wapello	135-3/8
Ron Petersen	Tipton	1990	Cedar	135-3/8
Jeff Jorgensen	Des Moines	1990	Clarke	135-2/8
Viril Deal	St. Ansgar	1990	Mitchell	135-2/8
Richard D. Berry	Ventura	1990	Emmet	135-1/8
Patrick Jorgensen	Creston	1990		135

#### BOW AND ARROW NONTYPICAL (Minimum qualifying score -- 155 points)

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
Denny Baum	Ottumwa	1990	Wapello	202-1/8
Darwin McCurdy	Linden	1990	Guthrie	188-5/8
Viril Deal	St. Ansgar	1990	Mitchell	180-4/8
Robert J. Van Roekel	Boone	1989	Boone	177
Brian Barclay	Davenport	1990	Cedar	171
Julian Toney	Lamoni	1990	Polk	170
Gary W. Schutt	Davenport	1990	Van Buren	170
Grant Pondexter	Indianola	1990	Warren	169-6/8
Patrick E. Barrett	Charles City	1990	Floyd	168-1/8
Dale Brock	Sioux City	1990	Plymouth	164-7/8
Larry Zirkelbach	Maquoketa	1990	Maquoketa	163-6/8
Dale Olson	State Center	1989	Marshall	163-5/8
Kevin Verhulst	Ottumwa	1990		163-3/8
Dick R. Paul	Red Oak	1990	Montgomery	162
Bob Branchcomb	Des Moines	1988	Warren	161-7/8
Jeffrey R. Coonts	Buffalo	1989	Scott	160-2/8
Jeff Roberts	Corning	1990	Adams	160
Paul Bazyn	Elkader	1990	Clayton	157-4/8
Scott Pelino	Buena Vista, CO	1990	Crawford	157-2/8

## All-Time Top 10 Racks

### SHOTGUN TYPICAL

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
Harold Dickman	Woodbine	1964	Harrison	200-2/8
Wayne A. Bills	Des Moines	1974	Hamilton	199-5/8
Kenneth Tilford	Lamoni	1985	Decatur	198-1/8
Michael R. Edie	Danville	1989	Des Moines	195-4/8
George L. Ross	Ottumwa	1969	Wapello	195-1/8
Forest N. Richardson	New Virginia	1989	Warren	194-3/8
Bob Jackson	Des Moines	1982	Madison	191
Monty Stark	Mt. Pleasant	1984	Henry	189-3/8
Gregg Redlin	Iowa City	1983	Johnson	187-6/8
Dennis Vaudt	Storm Lake	1974	Cherokee	187-5/8

### SHOTGUN NONTYPICAL

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
Larry Raveling	Emmetsburg	1973	Clay	282
Carroll Johnson	Moorhead	1968	Monona	256-2/8
David Mandersheid	Welton	1977	Jackson	253-3/8
*Larry J. Caldwell	Des Moines	1990	Warren	250-2/8
Carl Wenke	Cedar Rapids	1972	Lee	245
Wendell Prottzman	Mt. Pleasant	1988	Henry	238-1/8
Edgar Shields	Grand River	1986	Decatur	229-6/8
Bob Harding	Pleasantville	1985	Wapello	229-3/8
Duane Fick	Des Moines	1972	Madison	228-2/8
Leroy G. Everhart	Sumner	1969		224-4/8

### MUZZLELOADER TYPICAL

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Jerry Conover	Sioux City	1990	Monona	182-7/8
Patrick Burkle	Earlville	1990	Clayton	170-2/8
Steve Carter	Washington	1987	Henry	166-6/8
*David Hammel	Dorchester	1990	Allamakee	166-1/8
Larry Cutkomp	Donnellson	1989	Van Buren	164-6/8
Ron Murray	Missouri Valley	1987	Harrison	164-5/8
Ron Hansen	Hampton	1989	Franklin	164-3/8
*Dale Clayton	Glenwood	1990	Mills	164-1/8
Kevin McDonald	Amana	1990	Iowa	164
*Dennis DeVries	Pella	1990	Marion	162-7/8

### MUZZLELOADER NONTYPICAL

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
*Mike Moody	Hamburg	1990	Fremont	210-2/8
*Vince Jauron	Harlan	1990	Monona	209-1/8
Daniel Kaufman	Wapello	1984	Louisa	205-3/8
Dick Paul	Red Oak	1988	Montgomery	189-4/8
*Nathan Giddings	Morrison	1990	Jackson	188-1/8
*Pete Sanford	Osceola	1990	Clarke	181
*Craig Cretsinger	Spencer	1990	Clay	174-7/8
Jim Potter	Maquoketa	1990	Jackson	174-3/8

### BOW AND ARROW TYPICAL

NAME	CITY	YEAR	COUNTY TAKEN	TOTAL SCORE
Lloyd Goad	Knoxville	1962	Monroe	197-6/8
Robert Miller	Wyoming	1977	Jones	194-2/8
Richard Swim	Des Moines	1981	Warren	190-5/8
Kevin Peterson	Mediapolis	1989	Des Moines	188
Vern Backstrom	Des Moines	1986	Polk	180-1/8
Robert McDowell	Ottumwa	1985	Wapello	179
*Rodney Hommer	Woodburn	1990	Clarke	179-4/8
*Ronald A. Murphy	Kalona	1990	Washington	178-7/8
Glen Thompson	W. Burlington	1987	Des Moines	177-5/8
Ken Dausener	Dubuque	1984	Jones	177-3/8

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Jerry M. Monson	Clear Lake	1977	Cerro Gordo	222-1/8
David Propst	Duncombe	1987	Webster	219-3/8
Blaine Salzkorn	Sutherland	1970	Clay	218-1/8
Chris Hackney	Allerton	1983	Wayne	215-5/8
Joe Rettenmeier	Dubuque	1987	Dubuque	204-1/8
Phillip M. Collier	Burlington	1978	Des Moines	203-6/8
Ted Miller	New Virginia	1986	Warren	203-5/8
Bill Erwin	Sioux City	1966	Woodbury	202-5/8
*Denny Baum	Ottumwa	1990	Wapello	202-1/8
Dorrance Arnold	Oelwein	1977	Clayton	200-5/8

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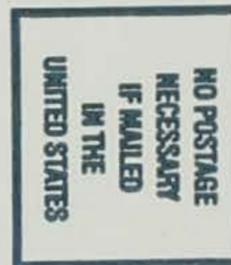
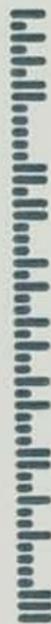
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*Helping Kestrels In Iowa*, May, 24  
*Nature on Wheels*, March, 24  
*Plans, Plants and Plantings -- Attracting Backyard Wildlife*, November, 8  
*The Bat: Creature of Horror or Benevolent Benefactor?*, October, 20  
Pheasant  
*From Feast to Famine*, November, 3  
*How to Grow Pheasants*, August, 19  
*Iowa and South Dakota Pheasants -- Looking Back*, October, 16  
*Pheasant in a Shorebird Body*, October, 29  
Turkey  
*1990 Top 25 Turkeys*, April, 21  
*1991 Hunting Forecast*, October, 3  
*All-Time Top 10 Turkeys*, April, 21  
*The Final Chapter -- Restoring the Wild Turkey in Iowa*, April, 7  
*Wild Turkey Harvest Declined in Spring 1991 Season*, September, 22  
Upland Game  
*1991 Hunting Forecast*, October, 3  
*Wildlife Farmer of the Year*, March, 22  
*Wildlife Film Series at DeSoto National Wildlife Refuge*, November, 23  
*Winter Upland Wildlife Survey*, July, 21
- WILKINSON, JOE  
*Groundwater Vulnerability*, August, 16  
*Water Conservation Around the Home*, June, 3
- WILLIAMS, EILEEN GANNON  
*Mini-Wetlands Make Waves*, August, 26
- WIRTH, DANIELLE  
*Classroom Corner*, October, 23
- WUNDER, GAIGE  
*Volga -- A Lake To Be Reckoned With*, January, 26
- ZENNER, GUY G.  
*Iowa's Nesting Waterfowl*, May, 6  
*Land of the Giants*, June, 28

# WARDEN'S DIARY

CHUCK HUMESTON

It was Friday. TGIF! It seemed the clock had taken twice as long to get to five o'clock. The weekend the Stressed Executive had waited for all year was coming -- opening of deer season. This was going to be the year.

Last year he was skunked. Goose-egged. He had taken several shots and missed every one. He was the only one in his group that didn't fill his tag. He had been hearing about that from the guys in his hunting party ever since. Well, this year was going to be different! Five o'clock! The Stressed Executive was on his way! He'd show them tomorrow.

Saturday, 5 a.m. Running out the door, the Stressed Executive jumped in the four-wheel-drive with his four partners. "Hey, think you can fill your tag this year, or do we have to do it for you?" Ha ha ha ha ha. The Stressed Executive glared at his friends. "Just watch," he muttered. They headed for the country.

Across town, the alarm clock rang. The Game Warden rolled over grumbling. By now the weeks of calls, complaints, confrontations and long nights were beginning to take their toll. "Deer season . . . wonderful," he muttered. The Game Warden staggered to the shower, threw on a uniform, and after a quick breakfast jumped in his car. "If I can just make it through this month," he thought to himself.

It was almost sunset. This was worse than last year. The snow was deep. It was cold. It was work. Struggling through the deep snow, the Stressed

Executive puffed, "Next week I start working out . . . drop a few pounds . . . this gun weighs a ton." Three tags had been filled, but not his. There was time for one more drive. The Stressed Executive and his friend were working each side of a tree-lined draw.

He stopped for breath. Off to his left he heard it. A crunch in the snow. He listened closer, his heart pounding. A rustle in the brush. He looked closer, the sweat running down in his eyes. A branch moving. He thought he could barely make out a rack. This will shut the guys up! He raised the shotgun to his shoulder. The branches moved. There it is! He pulled the trigger just as the branches completely parted showing a glimpse of orange.

The slug struck one of his friends squarely in the chest, expending all its kinetic energy. The wound was immediately fatal.

The Stressed Executive lowered the gun. Reality immediately hit him. He walked, then ran to his friend. He fell to his knees at his side. The look of surprise on his friend's face burned into his mind. He would see it forever. He screamed for the rest of his companions. They ran up and stared, horrified. "I thought I saw a rack!" he sobbed. "I saw the branches move!"

The day had been fairly routine. "Maybe this won't be so bad," the Game Warden thought. That ended with the radio call. "Request you respond to a hunting accident." He felt the sickening feeling in his stomach. His

hands tightened on the steering wheel. He reached down to activate the red light and siren, and requested an ambulance and other available officers.

He found three persons standing over the body, their faces ashen. Another was slumped against a tree, staring blankly. Finding no sign of life from the victim, he spoke briefly to the three. He walked to the Stressed Executive and knelt beside him. "Please tell me what happened here, sir."

A shaking of the head, a blank stare. "I heard the sounds. I thought I saw a deer." The Stressed Executive looked into the Game Warden's face. "I wish I could take back that shot," he sobbed. "I never saw him. It was only a mistake!"

Now the Game Warden found himself at the front door of the victim's house. He knocked. A little girl answered the door. "May I talk to your mother?" he asked. A young woman came to the door.

The Game Warden clenched his fists and took a deep breath, trying to keep his own emotions in control. "Ma'am, I'm sorry, but there has been an accident," he quietly began.

It had only been one mistake. One mistake which would affect many lives forever.

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*Editor's Note: This story is fictitious, intended to represent the possible events leading up to a possible hunting accident. It in no way intends to represent any person, living or dead.*

# CONSERVATION UPDATE

## SLUDGE + SWITCHGRASS + SUNLIGHT = AN ENERGY SOURCE

by Richard C. Schultz  
and Joe P. Colletti,  
Iowa State University  
Department of Forestry

A cooperative project is studying the role of sewage sludge in growing energy crops. The study, with participation by the City of Ames, Iowa State University and the Department of Natural Resources, looks at how a multi-cropping agroforestry system uses various quantities of sludge as a fertilizer and soil amendment.

The project provides a creative alternative cropping system for Iowa. Twelve hundred-foot-long strips consisting of six rows of short-rotation woody crops of poplar hybrids are planted between 50-foot-wide strips of forage sorghum/rye, switchgrass and crambe (an industrial oil seed crop). These crops are being used because of their energy-producing potential.

The switchgrass is

harvested in July and October. The double crop of fall-seeded cereal rye-forage sorghum yields a harvest of rye in July and sorghum in the fall. Two crops of crambe are planted each season with the last crop harvested in October. The trees are being grown on a six-to eight-year rotation and will be harvested in the winter. The staggered harvest dates for the various crops provides the Ames Water Pollution Control Plant with several windows for

application of sludge and will provide sources of biomass fuel over much of the year.

Two-thirds of the project has been planted with the last third to be planted in the spring of 1992. An increased yield of both the woody and herbaceous crops is expected because of protection from drying winds and increased growth from greater exposure of crops of different heights to sunlight. Increased growth also is expected from the application of

sludge which contains about two percent (dry weight basis) of nitrogen and lesser amounts of phosphorus and potassium.

In addition, about 50 percent of the sludge is organic matter that, when applied to the land, can improve the water and nutrient-holding capacities and structural characteristics of the soil. The first sludge applications were made in April 1991. Already visual differences suggest accelerated growth of the sludge-applied plants.

The unique component of this project is that it provides biomass energy that will close the energy cycle for the pollution control plant. The plant is already supplying a portion of its energy demands from methane gas produced by the digestion system. The biomass energy from the multi-cropping system will help to make the plant even more energy self-sufficient. Conservatively, the woody crops can produce 7 to 11 dry tons per acre per year without fertilization. Addition of the sludge could increase that by 200 percent.

## THE WINNER!





Ken Formanek

**Recycled grocery bags featuring the Turn In Poachers (TIP) logo and program information were distributed throughout Iowa last month at Hy-Vee Food Stores. TIP is a program which provides a method for citizens to report, anonymously, fish or wildlife violations and receive a cash reward. For information on the TIP program, contact Steve Derman, TIP coordinator, Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034, (515) 281-4515.**

Similar yields could be expected from the herbaceous crops. A gasifier unit is now being tested that will be used to convert the biomass for use by the pollution control plant energy system.

The multi-cropping or alley-cropping system will provide an environmentally safe and efficient method for treating sewage sludge while helping to meet some of the energy demands for cleaning the wastewater.

This research, which represents the

input of scientists and professionals from numerous disciplines and agencies, will provide data on costs, biomass production, environmental impacts, net energy output and the effect of wooded corridors on field crop production.

Moreover, the project will provide a "center of excellence" for the demonstration of alley-cropping to municipalities, regulatory agencies and farmers.

--Reprinted from the *Iowa Energy Bulletin*, September 1991

### **DNR Publications**

New and recently revised publications of the Iowa Department of Natural Resources are listed below. These publications are free unless otherwise noted (\$). We reserve the right to limit quantities. To request copies, write the Iowa Department of Natural Resources, Wallace State Office Bldg., Des Moines, Ia., 50319-0034.

*1990 Quickie Facts and Figures* (New; brochure on Iowa statistics on hunting, fishing, law enforcement, parks, forests, energy and water quality protection.)

*1991 Hunting Regulations* (New; 16-page booklet on Iowa's hunting and trapping seasons and bag limits.)

*1991 Hunting Season Card* (New; wallet-size card on Iowa's hunting and trapping seasons and bag limits.)

*Abandoned Underground Coal Mines of Des Moines, Iowa, and Vicinity* (New; 92-page book on coal mine locations and dates of operation in the Des Moines area. Includes a summary of geology in the Des Moines area; \$4.50 plus \$1.50 postage and handling; order from the Iowa Department of Natural Resources, Geological Survey Bureau, 123 North Capitol Street, Iowa City, Iowa 52242.)

*Iowa Public Hunting Areas* (Revised; 24-page booklet on public hunting areas in Iowa.)

*Iowa Trout Fishing Guide* (Revised; large format brochure/map on trout fishing in northeast Iowa streams.)

*Salamanders and Frogs of Iowa* (New; 24-page, full-color booklet on salamanders and frogs found in Iowa; \$2; available by early December.)

# CONSERVATION UPDATE

## Upcoming NRC, EPC and Preserves Board Meetings

The dates and locations have been set for the following meetings of the Natural Resource Commission, Environmental Protection Commission and the Preserves Advisory Board of the Iowa Department of Natural Resources.

Agendas for these meetings are set approximately 10 days prior to the scheduled date of the meeting.

For additional information, contact the Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319-0034.

### Natural Resource Commission:

--Dec. 5, Des Moines

### Environmental Protection Commission:

--Nov. 18, Des  
Moines

--Dec. 16, Des  
Moines

--Jan. 21, 1992  
(Tuesday), Des  
Moines

### State Preserves Advisory Board:

--Dec. 11, Des  
Moines

## Iowa Trophy Deer Records

Deer hunters who successfully bagged a deer with trophy-sized antlers are encouraged to enter the rack in Iowa's annual big game records registry. Award certificates and patches will be issued to eligible entries which meet minimum standards set by the Iowa Department of Natural Resources. A list of deer taken and measured each year will be printed in the *Iowa Conservationist* magazine (see page 12 for this year's listing).

In order to qualify for an award, however, a rack must be scored by an official scorer for the Boone and Crockett (firearms) or Pope and Young (archery) clubs, or by a wildlife biologist, conservation officer or other individual certified by the DNR. The scoring system used for Iowa records is identical to that used by the Boone and Crockett and Pope and Young clubs.

Award certificates will be presented in six classes. The classes, with minimum scores for each, are:

### Shotgun

Typical -- 150 Points  
Nontypical -- 170  
Points



Roger A. Hill

### Muzzleloader

Typical -- 150 Points  
Nontypical -- 170  
Points

### Archery

Typical -- 135 Points  
Nontypical -- 155  
Points

Deer hunters possessing trophy racks which have not been officially measured may contact the Iowa

Department of Natural Resources, Wallace State Office Bldg., Des Moines, Ia., 50319-0034, (515) 281-5145.

Because of shrinkage in varying degrees, racks taken during the recent hunting season cannot be measured for at least 60 days in order for the antlers to dry out properly.

## Iowa to Have Energy Education Center

The University of Northern Iowa will be the site of a new Center for Energy and Environmental Education through a \$4 million grant from the U.S. Department of Energy. The building will be designed to be a state of the art structure in terms of high energy efficiency, and its systems will be "visible" to the extent possible so it can serve as a model.

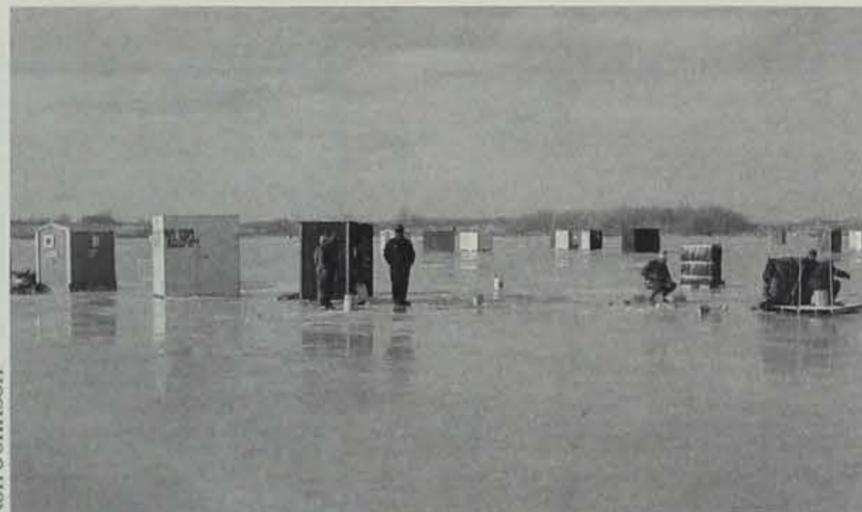
It will contain

three laboratories to support the development, testing and evaluation of curriculum materials in both environmental and energy education.

A resource center of national caliber is also planned, along with capabilities to produce programs for distance learning. Space for visiting faculty and professionals is included, as are classrooms to support programs for teachers, business people, government officials and the public.

### Donations

Don Udelhoven Boone	Materials and labor valued at \$85 for snow plow repair at Ledges State Park
Garst Seed Research, Inc. Slater	230 bushels of corn valued at \$598 for wildlife at Ledges State Park
John McMurray Mason City	Materials and labor valued at \$350 for special event at McIntosh Woods State Park
Kemmerer Marine Clear Lake	Advertising valued at \$50 for special event at McIntosh Woods State Park
Kramer Home and Hardware Clear Lake	Prizes valued at \$50 for special event at McIntosh Woods State Park
Mark Kerr Clear Lake	Prizes valued at \$123 for special event at McIntosh Woods State Park
Mason City Artificial Ice Mason City	Materials valued at \$520 for special event at McIntosh Woods State Park
Metropolitan Federal Bank Clear Lake	Advertising valued at \$50 for special event at McIntosh Woods State Park
Nelson Petroleum Products Clear Lake	Materials and labor valued at \$300 for special event at McIntosh Woods State Park



Ron Johnson

### Ice Fishing Shelter Laws

Ice anglers are reminded of the laws regarding ice shelters on state-owned land or waters.

Ice fishing shelters left on the ice overnight must have the owner's name, street address and city in four-inch or larger block letters on all sides in a color contrasting to the background. This owner

information will act as a permit.

All fishing shelters left on the ice after sunset must have amber reflectors attached to all sides of the structure. Also, the structure must not be locked while in use.

Shelters must be removed from all state-owned waters on or before ice melt or by Feb. 20, whichever comes first.

### Wildlife Film Series at DeSoto National Wildlife Refuge

A weekend wildlife film series will be featured each Saturday and Sunday during December, January and February at the DeSoto Visitor Center, DeSoto National Wildlife Refuge located near Missouri Valley.

The film series will feature a different wildlife or nature

subject each week. The films will be shown at 1:30 p.m. and 2:45 p.m. each day. Payment of the refuge entry fee will entitle visitors to view the films.

For more information, contact Mindy Sheets, DeSoto National Wildlife Refuge, Rte. 1, Box 114, Missouri Valley, Ia., 51555, (712) 642-4121.

by Kathryn Stangl

# The Situation is This . . .

Leaking tanks, groundwater contamination, insurance questions, increased costs, site testing and cleanup are some of the buzz words and phrases associated with underground storage tanks (USTs) seen in headlines. Do these phrases mean more risks, greatly increased costs and further groundwater worries for the average Iowan? What does all this mean when we fill our gas tanks at the corner station?

This means consumers contribute one cent per gallon of gasoline to help pay the environmental costs of pollution caused by leaking underground storage tanks.

It may also mean that some petroleum tank owners decide to close rather than make costly upgrades to their tank systems. Many of the tanks in Iowa may be 15 to 20 years old and have no leak detection or spill/overflow prevention systems. They do not meet current government standards and may be leaking, posing an environmental threat. To bring them up to standards would be expensive.

The keyword regarding underground tanks is *priority*. Setting priorities so the limited amount of funds, staff and resources are used to their best advantage, and Iowans and the environment are protected, is the main thrust of the most recent legislation involving tanks. Guidelines for site and risk assessment and contamination control and cleanup, are necessary so that sites receive attention in order of the severity of their impact on Iowa's environment, especially on the state's groundwater.

The newest changes in the UST program have come from 1991 legislation. New rules are being adopted that will change the requirements of site cleanup reports, corrective action of contamination, secondary containment for new USTs installed at contaminated sites and the registration of groundwater professionals. To keep the site assessment and cleanup processes moving, however, temporary rules went into effect August 29, 1991.

While priority is the keyword for environmental protection in Iowa, sometimes a citizen's priority is



Ron Johnson

having the latest information. With that in mind, here are some brief answers to common questions asked about underground storage tanks.

## **“What about the increased number of leaks reported this year? Are more tanks springing leaks or are standards more stringent?”**

A total of 4,228 leaks have been reported since 1987, but more leaks (2,354) were reported during 1990 than any other year. The number of reported leaks probably peaked during this year due to the October 26, 1990, deadline for state cleanup fund and insurance applications.

## **“Does the DNR “pick and choose” which tanks should be regulated?”**

All underground storage tanks (except tanks used to store heating oil for on-site consumption, septic tanks, flow-through process tanks, etc.) must be registered with the DNR. Farm and residential tanks are registered just one time. For all other tanks there is an annual management fee. An underground storage tank is defined as a tank and associated piping with 10 percent or more of its volume underground, which stores or has stored a petroleum product, a hazardous substance or a toxic substance. Owners and operators of USTs containing petroleum or hazardous substances must report, investigate and re-

spond to all suspected or actual releases. A release must be reported to the DNR within 24 hours or within six hours if a hazardous condition exists.

**“What about all the different UST programs? Are they competing? How do I know what is required or where to go for information?”**

The different terms used for the DNR's underground storage tank program, the Iowa UST Fund, the Iowa UST Financial Assistance Program and the Iowa Comprehensive Petroleum UST Fund Board can all be confusing. The use of the general title, "Iowa UST Program," by the financial assistance program may have caused it to be mistaken as part of the DNR's regulatory program. The board has begun using "Iowa UST Financial Assistance Program" to describe their general program.

The Iowa Comprehensive Petroleum Fund Board is the agency responsible for the state financial programs to assist petroleum UST owners and operators. These programs provide funds for guaranteeing loans for small businesses having to meet tank rules, funds for cleanup of contamination caused by petroleum tanks and insurance to meet financial responsibility requirements.

Questions about tank removal, installation of new tanks or upgrading old ones, contamination cleanup requirements or reporting leaks can be answered by the DNR. The DNR's role in underground storage tank regulation is limited to registration, certification of tank piping and installation, leak and spill cleanup, and monitoring change in service or permanent or temporary closure. A 24-hour emergency response number can be used to report a leak (perhaps from an overflow) or vapors (in a basement, for example). This number is to be used for reporting only environmental spills and releases of hazardous materials. The emergency response number is (515) 281-8694. If you have a question on an individual tank or site without a spill, use the DNR central office address or call (515) 281-8693.

**“What about the deadlines and rules the DNR is “always changing?” Aren't they much tougher than the federal standards?”**

The DNR and federal requirements are the same (by state law the state's rules can only be as stringent as the federal rules). DNR is responsible for administering the technical rules that contain standards for new tank installations, upgrading of old tank systems, finding and cleaning up contamination and requiring tank owners to show financial responsibility. The financial programs have their own requirements and deadlines. The UST Board can have rules more restrictive than the federal tank regulations. One example is the earlier deadlines that have been adopted for upgrading tank systems in order to remain eligible

for the state insurance program.

The DNR has not changed the deadlines for owners to upgrade their systems with leak detection, corrosion protection and spill/overflow prevention. These dates have remained the same since the adoption of the federal underground storage tank rules in October 1989.

**“Do I have to go through “a lot of red tape” to change ownership or close a tank?”**

If ownership changes due to property transfer, it is not necessary to re-register the tanks. A letter to the DNR stating the name and address of the previous owner, location of the tanks and the new owner's name and address is all that is required, and the registration record will be updated to show the new owner information.

A permanently closed tank is not removed from registration as an active tank until a complete closure report is received. Closure guidance documents with complete instructions are available from the DNR.

**“Where can I find answers to questions about underground storage tanks?”**

For answers on how to report leaking USTs, tank removal, upgrading a tank system, new tank installation standards or contamination cleanup requirements, contact the DNR.

The *UST Newsletter*, published by the DNR, is available without charge to anyone interested in the underground storage tank programs. The newsletter helps concerned individuals stay aware of changes and requirements related to underground tanks, answers questions, explains terms and assists tank owners in both understanding and meeting regulatory requirements. If you wish to be placed on the mailing list for this newsletter write or call the DNR.

The DNR has written information available about many aspects of USTs. In addition to the newsletter there is a series of publications called *Straight Talk on Tanks*, covering different aspects of approved leak detection methods. Information titled *Sampling Methods for Routine Monitoring of Groundwater Wells for Non-petroleum Substances* is available, as well as copies of the rules pertaining to underground tanks. This information is available by writing the DNR at 900 East Grand, Des Moines, Iowa 50319-0034, or by calling (515) 281-8693 (TDD number (515) 242-5967).

For information on state insurance or financial cleanup funds, contact the Iowa Financial Assistance Program, c/o Williams and Co., 814 Pierce St., Sioux City, Iowa 51102, (800) 942-1000 (in-state calls) or (712) 252-1455 (out-of-state calls).

*Kathryn Stangl is an information specialist for the department in Des Moines.*

Article by Patricia S. Cale • Photos by Ken Formanek

# 1991 Iowa Energy Leadership Awards

*Iowa's 1991 Energy Leadership Award winners make things happen in energy efficiency and renewable resources. Here are this year's winners.*



## What Does an Energy Efficient Home Look Like?

Bill Eich of Bill Eich Construction in Spirit Lake wants people to know they don't have to live in a cave to have an energy-efficient home. If Bill Eich builds a house for you, it will have lots of windows, vaulted ceilings, sliding glass doors onto the deck, a fireplace and plenty of floor space — all the elements thought to cause high energy bills.

**Bill Eich Construction Company, Inc.**

**The Spirit Lake home builder and commercial contractor builds houses people want to live in. Energy efficient techniques build in comfort and affordable energy costs.**



It's because of Eich's use of innovative construction techniques that his houses can incorporate those desirable features and still cost little to heat and cool. Several of Eich's recently constructed homes contain between 2,700 and 4,200 square feet of conditioned space, with heating bills of between \$250 and \$500. Per month? No, per year!

### **Air-Tightness and Extra Insulation Provide Energy Savings**

Eich's houses are so efficient because they are built to be air-tight. Every possible air leak is sealed as the house is constructed. In addition, the homes are well insulated, from the basement to the roof.

Eich uses several types of foundation insulation, including one called a "frost-protected shallow foundation," which he learned about from Canadian builders. In conventional construction, foundation footings have to go down at least 42 inches to reach below the frost line. With this new technique, which involves actually insulating the ground around the foundation, footings only have to go down 16 inches, saving \$800-1,500 per home.

Eich has also begun to use a new basement insulation technique developed by Lite-Form, Inc., of Sioux City. Styrofoam forms are built and the concrete is poured between them for the basement walls. The forms are left in place and serve as both interior and exterior insulation. "The basement can be finished in two days with this technique — one day to build the forms and one to pour the concrete," according to Eich.

No source of air leak escapes Eich. For example, a special electric outlet box with a gasket to seal around it is used, though Eich has to import it

directly from its manufacturer. "It's the small details like that that set us apart," he said. "We've started inventorying this type of equipment ourselves and even supplying it to other local builders."

### **Central Ventilation Keeps Air Fresh as Spring**

With the houses so air-tight, what about indoor air quality and moisture control problems? Eich addresses these issues with a central ventilation system that runs kitchen and bathroom fans automatically to remove moisture and provide fresh air. "With the old way of putting in separate bathroom and kitchen fans, people don't properly operate them. They're too noisy and people don't run them long enough," he said. With the automatic system, the house gets the proper ventilation all the time.

Bill Wirtanen, an owner of a Bill Eich-constructed home in Spirit Lake, said he initially opposed having the central ventilation system. "Bill Eich wouldn't build the house without the ventilation system. We were at loggerheads at first," he said. He now is pleased with the system because it has provided cleaner air and less dusting.

### **Moisture Problems Led to Energy Efficient Construction**

Eich learned about energy efficiency because of moisture problems. It was to address moisture problems that Eich became interested in new construction methods. "It turns out that most things done about moisture also save energy," according to Eich.

Eich began going to seminars about six years ago to learn the new techniques, after having been in the construction business since 1974. "A lot of my competitors laughed behind

my back that I had to go to school to learn how to build a house," he said. But the training has paid off. Bill Eich Construction consistently does \$1.5-2 million in business per year, even during recession years.

"Clients come to me for my creativity and style. When they hear about the energy efficiency, they don't look any further for a builder," said Eich. "Even though costs for an energy efficient home are two to five percent higher, very few ask me to leave anything out."

Because enough consumers in northwest Iowa have been educated through friends and family owning Eich-constructed homes, other builders have begun to understand the benefits of energy efficient construction as well. "Now, probably 50 percent of the homes being built in Dickinson County are built with these techniques," Eich said.

### **National and International Influence**

Eich's influence and knowledge have spread well beyond Dickinson County, though. As a member and, last year, president of the Energy Efficient Building Association, he has given seminars around the U.S. and Canada for builders from all over the world. In addition, he serves on the energy committee of the National Association of Home Builders and on the board of the Iowa Association of Home Builders. He reviews technical papers as a consultant to the U.S. Department of Energy.

Each energy efficient home built by Bill Eich Construction has a brass kickplate on the bottom of the front door. The kickplate, with the company's emblem embossed on it, is "a sign of lasting quality," said Eich.

## Iowa Association of Municipal Utilities.

Representing publicly owned utilities in 425 Iowa cities, the IAMU is making energy efficiency its number one priority. Wiser energy use can mean economic development in communities across the state.



## Municipal Utilities Facing Reality with Efficiency Efforts

Iowa's publicly owned utilities are just facing reality. "The reality is that high energy costs, environmental concerns and public opinion are all pointing in the same direction — toward energy efficiency," according to John Bilsten of the Iowa Association of Municipal Utilities (IAMU).

The IAMU represents Iowa's 425 cities with municipal electric, gas or water utilities. For the past two years IAMU has made promoting energy efficiency among its members its number one priority. And that effort is taking root, with efficiency programs springing up in communities across the state.

### Reflecting the Community's Concerns

Iowans' interests in environmental quality and economic health are spurring the energy efficiency efforts. "Because municipal utilities are locally governed, they reflect the concerns of the community. When city council members make decisions on their municipal utility, the first question they ask is 'What's good for the community?'" said Bob Haug, IAMU executive director.



Because of this local decision-making, municipal utilities can be leaders in efficiency efforts, according to the IAMU. "The shareholders in a publicly owned utility are the community. And the dividend is paid in lower utility bills," said Bilsten.

The linkage between energy efficiency and community economic development is one that the IAMU stresses. A computer program called *OPTIONS* is one tool to help make that link. The program, which has been used extensively by Iowa communities, shows the economic outcomes of efficiency measures, such as how many jobs would be created or how much additional money would circulate in the local economy.

*OPTIONS* is designed to convince local leaders of the value of taking action on energy efficiency. "You can send truckloads of compact fluorescents to a city, but without local commitment nothing will happen," said Haug. The program allows communities to use energy efficiency to accomplish their own goals.

### A Laboratory for Innovation Iowa's municipal utilities

range from Westfield, with 90 customers, to electric and gas systems serving cities like Ames, Cedar Falls and Muscatine. The numbers and diversity of Iowa's publicly owned utilities make an ideal situation for experimenting to find out which efficiency programs can be most useful. They are a laboratory for innovation on efficiency.

A number of Iowa's municipal utilities are already carrying out innovative efficiency efforts. The following is just a sampling:

**Ames.** Operates one of the nation's first waste-to-energy plants.

**Cedar Falls.** Built an energy-saving house to demonstrate that energy efficiency and attractive design are compatible. Started a tree-planting program on its property.

**Denison.** A load management system reduces peak demand by cycling air conditioners.

**Hawarden.** Three grain elevators and a gravel company voluntarily reduce their electric demand when notified of a peak alert, saving the community about \$30,000 annually.

**Laurens.** Saved 3,000

gallons of fuel oil per year by insulating around the radiator of the city's standby diesel engine generator.

**Muscatine.** Offers rebates for purchase of energy efficient appliances. Also is only utility in Iowa using an emissions scrubber system to reduce pollution from burning coal.

**Osage.** Internationally recognized for programs ranging from free water heater jackets to load management on air conditioners.

**Sioux Center.** Provided services such as energy audits, blower door tests and infrared scanners. Initiated use of refuse-derived fuel to substitute for fossil fuels.

**Spencer.** Replaced street lights with efficient high pressure sodium. Provide energy audits, including analysis of energy usage by individual appliances.

**Traer.** Conducted the nation's first community-wide efficient lighting exchange, trading compact fluorescents for customers' incandescent bulbs.

**Waverly.** Underwrote purchase of efficient lighting which are sold at a discounted price by community organizations. Investing \$100,000 to plant trees in the community.

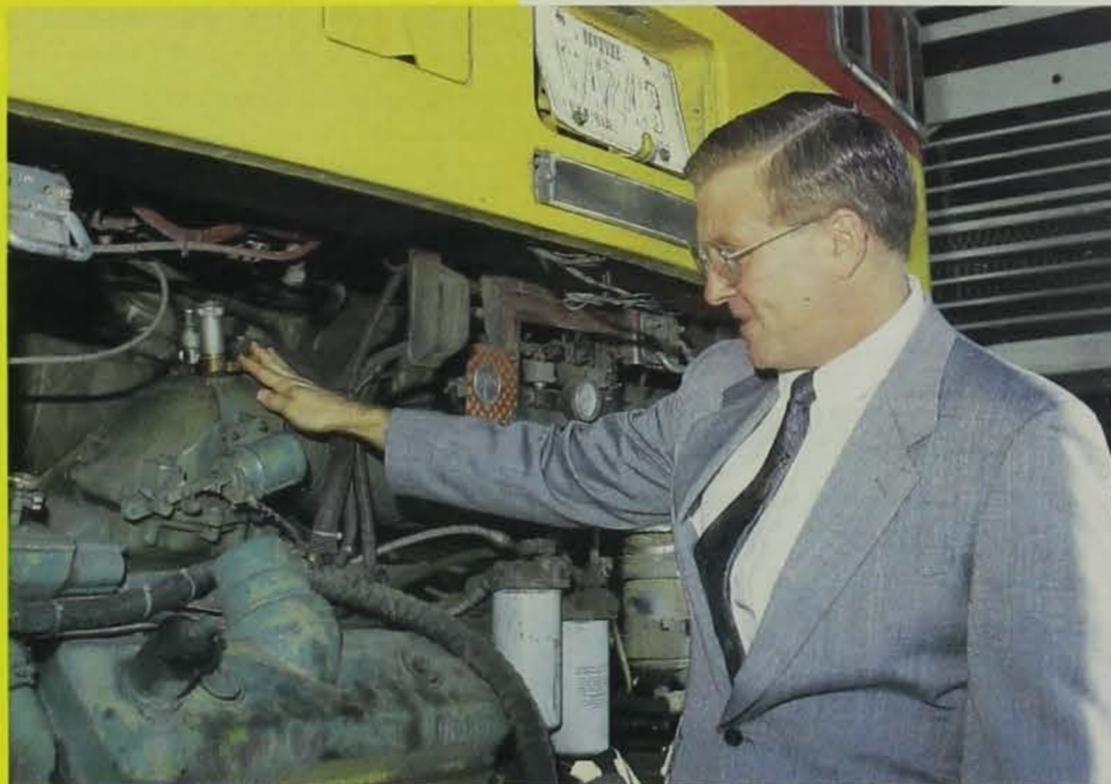
**Webster City.** Sponsored a lighting program for area businesses, and uses advertising to promote energy saving ideas.

### Providing the Help Members Need

Because of the range of size of its member utilities, IAMU has created programs that can be customized to each community's needs, for example, a new newsletter service — the *Iowa Energizer*. For the subscribers, the IAMU creates a quarterly newsletter featuring a front page story on each individual utility, with the remaining content generic to all.

Other programs on the menu of energy efficiency efforts include energy audits, appliance rebates and lighting projects. The IAMU offers materials and technical assistance on how to develop and implement programs that will work.

The IAMU views providing energy efficiency programs as another way for utilities to serve their communities and customers. "We want our utilities to be the place customers go for all their energy questions, not just the place they go to pay their bill," said Bilsten.



### Ethanol System Makes Air Pollution a Thing of the Past

A polluting dinosaur is headed for extinction, thanks to an Iowa company called Midwest Power Concepts. The old diesel bus will no longer

belch clouds of black, lung-choking smoke in cities across the country. Instead, clean-burning ethanol will be injected into the engine and mixed with diesel to fuel the buses and reduce air pollution.

The black cloud that comes out of buses' tailpipes results from incomplete combustion of diesel fuel. The ethanol injection system substitutes ethanol for diesel fuel just when the engine needs more power. That

### Midwest Power Concepts.

**An inventor from Radcliffe has created an ethanol system for city buses and trucks that will reduce air pollution and create a new market for a renewable fuel. The company is working to promote ethanol and its system as a clean air solution.**

makes the black exhaust — discharged when the bus starts off — a thing of the past, according to Dwayne Fosseen of Radcliffe, the inventor of the system. The Emission Control System, a computerized control on the bus, continually monitors the fuel blend, and “meters in the correct amount of ethanol as the engine requires it,” said Fosseen.

### **Metro Cooperation**

Midwest Power Concepts and the Des Moines Metro Transit Authority have cooperated in testing and implementing the ethanol system. “Five years ago, we installed the system on one bus — Bus Number 180. Then we put it on two buses and kept experimenting,” said Warren Dobbertin, president of Midwest Power Concepts.

For two years now, after receiving a federal grant, 17 Des Moines Metro buses have operated with the ethanol system, “with no engine breakdowns,” said Dobbertin. The entire Metro fleet of 110 buses will soon be equipped with the ethanol emission control system.

### **Clean Air Driving a Clean Fuel Solution**

The Midwest Power Concepts system can help bus systems around the state and nation to meet new federal clean air standards.

According to Fosseen, “we have achieved the new standards with today’s engine. By using our ethanol retrofit, bus systems won’t have to replace the fleets already on the road.”

The clean air standards are being applied first to buses to allow for testing of alternative fuels before other heavy duty vehicles such as trucks must comply. In addition to ethanol, experiments are being conducted around the country using other fuels such as methanol and compressed natural gas.

“If the only objective is clean air, then these other fuels can work. But methanol and natural gas are not as attractive as ethanol because they aren’t renewable resources and they don’t address national security issues,” said Dobbertin. In addition, according to Dobbertin, ethanol has the advantage for reducing maintenance costs and keeping engines running longer.

### **Branching Out from Des Moines**

With testing being finalized on the Des Moines Metro fleet, Midwest Power Concepts is ready to branch out. Already, the company has installed its system on buses in Cedar Rapids and Decatur, Illinois. Orders for the ethanol injectors have come in from Minneapolis and Jackson, Michigan.

In Las Vegas, Midwest Power Concepts equipped both a city bus and a private garbage truck with the ethanol system. Tests performed on the garbage truck showed emissions reductions of 64 percent, with an increase in fuel economy of 9.8 percent. With those results, the private garbage hauler is planning to equip its entire fleet of trucks with the new system.

### **Fuel for the Future**

Midwest Power Concepts has big plans for the future, but big obstacles remain in the company’s path. “There is a big market for ethanol in this application — we estimate a one to two billion gallon potential per year,” said Dobbertin. “But we’re a small speck in that market.”

The company has been hindered in testing its system by lack of access to laboratory facilities. To solve that problem, they are considering building a certified lab outside Ames to test their system and other

ethanol products.

In addition, ethanol does not have the support on the national level that other alternative fuels do. Dobbertin spends much of his time in Washington, D.C., trying to remedy that situation.

Fosseen and Dobbertin remain optimistic, however, about ethanol’s future and about the future for Midwest Power Concepts. After nearly 10 years of development, they have a system that offers a clean air alternative to American cities. With Midwest Power Concepts equipped buses and trucks, polluting dinosaurs will no longer roam the streets.

## **Energy Efficiency Guarantees Low-Cost Apartment Living**

Many of the tenants in Keith Denner’s apartments probably don’t know why their electric bills are so low. They’re just happy that they’ve got an affordable, comfortable, attractive apartment to live in. And having the heat and water paid for is great, too.

The tenants in the Sun Prairie and Vista Court apartments in West Des Moines and in other units managed by Denner’s Professional Property Management, Inc., (PPM) in Ames and Des Moines, don’t have to think about energy efficiency because Denner’s done the thinking for them. Energy and water-saving features are designed and built into the apartments, and the costs to operate the units reflect that.

### **Living Costs Guaranteed**

For a one-bedroom apartment at Sun Prairie or Vista Court, renting for \$460-490 per month, a tenant’s only other cost will be \$25 for electricity —



ciency features of the apartments. First, the buildings have eight-inch thick walls with super-insulation. Thermal-pane casement windows also have insulating window quilts to keep heat out during the summer and in during the winter. Refrigerators, ranges and microwave ovens, which are provided to tenants, are chosen for their efficiency, not cost.

#### Window Quilts Increase Comfort

The window quilts are the most noticeable feature in the apartments, and on a summer day, most of them are closed to

keep out heat. "The tenants definitely use the quilts, though for their own reasons, not mine," Denner said. "They use them because they make them more comfortable."

The quilts in the bedrooms are opaque, shutting out light during the day. Denner said that several nurses who work night shifts chose his apartments for that feature alone, so they can get a "good day's" sleep.

The buildings also have water-saving appliances such as low-flush toilets, flow restrictors and low-flow showerheads. "I must have tested 30 different showerheads before I found one I liked," said Denner. After changing 400 showerheads in his Ames units, he only received one complaint. On the contrary, "I got more compliments on the great shower people were getting with the new fixtures," he said.

The kitchens in every unit and the common areas of the apartment complexes contain no energy-wasting incandescent light bulbs. Instead, fluorescent and compact fluorescent fixtures are used. "Just changing the lights in the landings of five buildings in one West Des Moines complex generated \$2,000 in annual savings and added \$20,000 to the value of the project," Denner said.

#### Higher Building Costs Pay Off

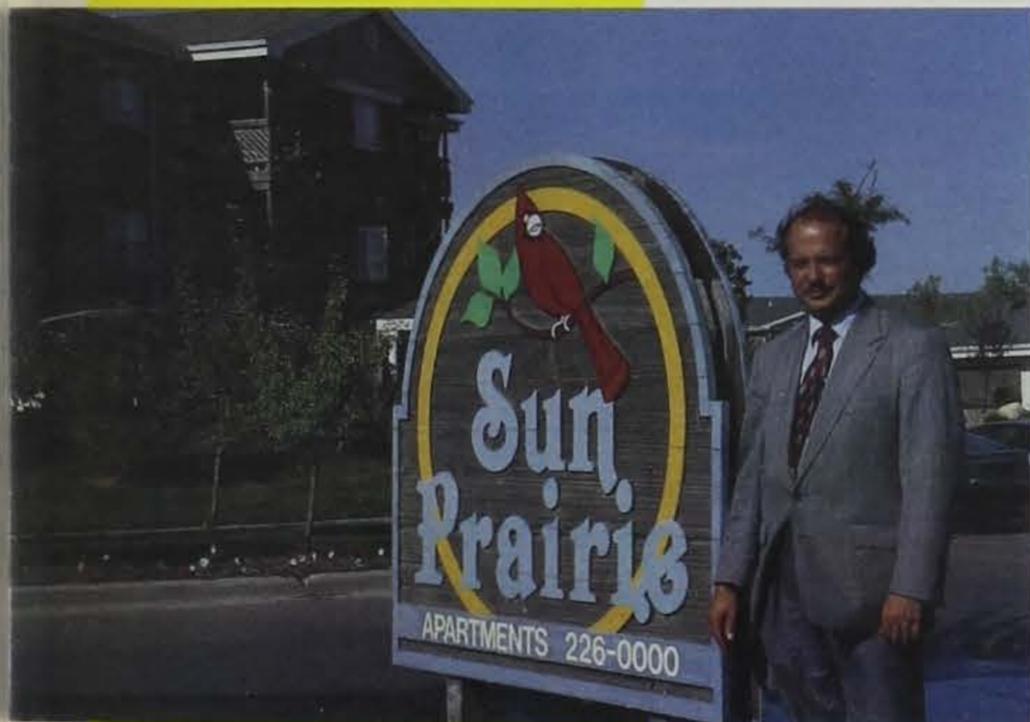
Although building in efficiency costs the developer more initially, the units cost much less to operate over their lifetimes. "Operating expenses and cash flow are the keys to income properties," Denner said. "The Sun Prairie complex included \$104,000 in extra costs per 24-plex for efficiency and other features, but my heat and water bills are just a fraction of my competition's."

Convincing the bankers and appraisers of the value of spending more upfront to generate more cash flow later on has been a battle for Denner. "But I feel I've succeeded now that my appraiser has built his own building and incorporated all the features I've been using," he said.

The PPM apartments don't have fireplaces or arched windows. But at Sun Prairie and Vista Court tenants can sunbathe beside one of the two swimming pools, lounge in the hot tub, relax on their decks or use the on-site playgrounds. Best of all, they can rest easy knowing that their next month's bills won't break their budgets.

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*Patricia S. Cale is an energy information specialist with the DNR in Des Moines.*



#### Professional Property Management Company, Inc.

**This Ames-based company is addressing a tough issue in rental housing — who's responsible for the utility bill? New super-efficient apartments give both landlord and tenant an incentive to conserve energy.**

guaranteed. Heat, hot water and sewer are paid for, and PPM guarantees that the electric bill will be \$25 or less, or the company pays half the difference. "In two years, we've only paid six people a total of \$200 for exceeding the guaranteed amount," said Denner.

PPM can make that guarantee because of the energy effi-

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