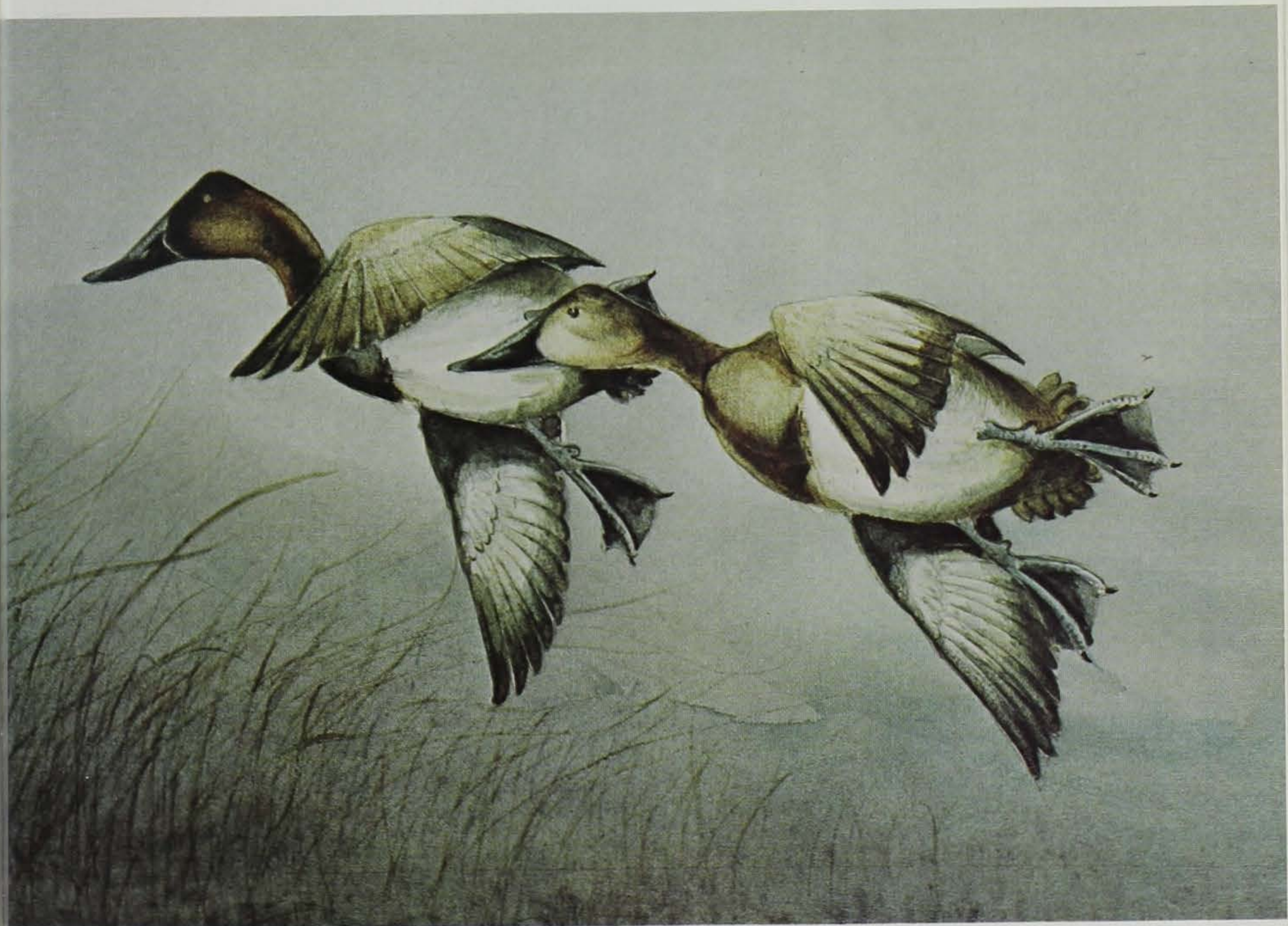




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FORESTS and the ENVIRONMENT

By Stan Tate DISTRICT FORESTER

IT IS EASY for modern man to forget his link with the forest, but that link is no less real then in the days of Colonial America.

AIR is perhaps the most essential element in our lives, and the cycle of carbon dioxide and oxygen between animals and green plants is well known. Forests have a significant effect on air quality. They not only act as producers of oxygen, but they also filter and cool the air. Trees, because of the tremendous surface areas of their leaves, are very efficient collectors of dust and airborne particles. Many species have pubescent (fuzzy) leaves, which increases their ability to collect dust many times.

The cooling effect of the forest can have a strong influence on the local climate. A mature oak can evaporate from its leaf surfaces as much as 50 gallons of water per day; water that has been drawn from the soil by the tree's roots. This "air-conditioner" effect in combination with the shade cast by the tree can result in summer temperatures within the forest 20 to 30 degrees cooler than adjacent open land. Everyone has experienced the welcome relief of a shade tree on a hot day, after a few hours working in the sun.

FRESH WATER is an essential element in our lives, yet one we tend to take for granted. Forested watersheds are highly prized for their ability to produce clear, clean water. Yet this process is almost universally misunderstood. The trees themselves only play a minor role in the ability of the forest to produce clean water. The leaves and branches of mature trees intercept the rain drop far above the forest floor and cause that raindrop to disperse its kinetic energy before it hits the ground. In most forests however, the main tree canopy is quite high and as the raindrop falls from the leaf it again starts picking up speed, accelerating rapidly. If it falls more than 32 feet it has regained 100% of its maximum velocity and therefore strikes the ground with as much erosive force as if it had fallen without striking the tree tops.

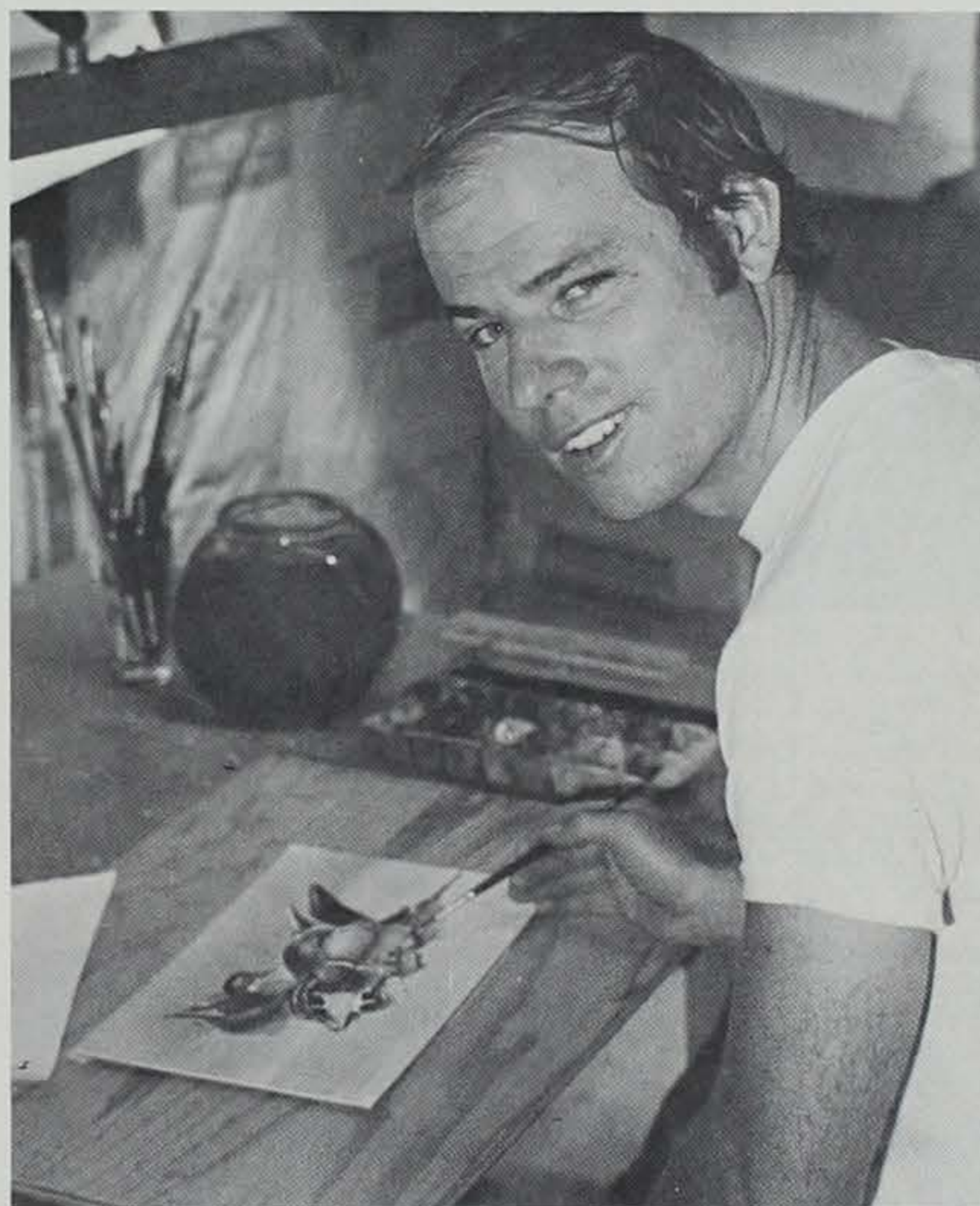
It is the leaf litter layer that protects the forest floor from erosion most effectively. The leaf litter layer forms "springy-spongy carpet" on the forest floor and is an absolutely essential part of the forest ecosystem. The litter layer has many functions. It acts as a thermal insulation blanket, preventing high soil temperatures in the summer and protecting against deep frost penetration in the winter. The litter layer is also an extensive composting system, allowing the waste products of the forest to be recycled within the system, without pollution. It is one of the wonders of nature that the litter layer is decomposed by fungi at the same rate at which new material is added. If the decomposition were too fast the litter layer would decay and leave the soil exposed before the next seasonal addition of dead leaves. If it were too slow the leaves would build up to great depths and interfere with the development of young trees. This composting process is caused by aerobic fungi which need a constant supply of oxygen. It is the same process that is used in the gardener's compost pile, where leaves and garden wastes are converted into rich, loamy soil. This is why it is not necessary to fertilize the forest to obtain good growth, even after centuries of systematic harvesting.

The leaf litter layer acts as a trap for surface water. The litter-layer itself is composed of three not always very distinct layers. The upper layer is composed of whole and unrotted leaves and debris; in the middle layer most of the leaf is rotted and only veins and stems are still readily recognizable; in the bottom layer the leaves and twigs are no longer recognizable and appear to be a dark, loose and moist humus. Thus the leaf litter layer is ideally suited to intercepting surface runoff and slowly filtering it into the soil. This of course has a slowing effect on the rainfall's steady migration toward the sea. Once trapped by the forest it is held in the soil, only to be released days or weeks later.

The leaf litter layer, so essential to our supply of clean water, nourishes and protects the trees, just as the trees nourish and protect the litter layer. The coolness and shade from the trees help regulate the rate of decomposition of the leaf litter, and at the same time protect the aerobic fungi from the hot sun, which could impair their essential operations. *(Continued on Page 16)*

Cover Story

The 1976 Iowa Migratory Waterfowl Stamp design is the work of Nick Klepinger, Reasoner, Iowa. His design was selected as winner from more than 40 entries in the annual Iowa Duck Stamp Contest. Klepinger not only is an aspiring artist but is a capable wood carver in three dimensional and relief work.



National Landmark Named Near Ruthven

An area six miles northwest of Ruthven, near Lost Island Lake, has been dedicated as a National Landmark.

The State Conservation Commission and the National Park Service Representative from West Branch, Iowa, has named Dewey's Pasture and Smith's Slough as the famous region.

The sight was accepted for being in its mostly near natural condition last November but the official dedication ceremony was held June 5.

Ruthven's State Conservation Representative, Bob Barratt, of Des Moines, accepted the certificate.

The land known as Dewey's Pasture was purchased by the Dewey Brothers in the mid 1930's.

The majority of Ruthven residents are familiar with Smith's Slough as the land formerly owned by Tom and Dick Eilers.

These National Landmarks can easily be seen by any interested party at any time and have been designated appropriately, adding to our town's bicentennial celebration.

Dove Season Opens

By Fred A. Prielwert

FOR MANY IOWA HUNTERS, the long wait is over—the dove season has finally arrived. To them, the mourning dove will present a kind of hunting they can find with no other game bird. The dove is easily the most abundant and popular game bird in the United States and North America for that matter. The prolific doves congregate en masse before the fall migration flights, offering great sport to the hunter knowledgeable of their habits.

But availability is not the only reason for the dove hunter's preference. If Iowa hunters match the national average, they will miss four of every five doves that come rocketing by. The bird is indeed a challenging target.

It comes as no surprise that much money and time has been spent on dove banding and research in Iowa, a leading dove producer, as well as in other states. It comes as no surprise that the U. S. Fish and Wildlife Service has compiled much biological data on this important migratory game bird. It also comes as no surprise that the federal framework allowing a dove season was sent to Iowa again this fall. Unfortunately, it comes as no great surprise that again, Iowa will *not* have a dove season.

Oh yes, Iowans will hunt doves. They *will* miss four of five shots at this sportiest of birds. They *will* experience dove hunting at its finest when the birds congregate in flocks of hundreds for the September migration. They *will* enjoy the flavor of a fine, table-worthy game bird. Many Iowans will be there for the opening of dove season—in Missouri, in Kansas, in Arkansas, and in Illinois.

Nationwide dove population surveys show that the Midwest is the top dove-producing area in our country. Although Iowa ranks high nationally, other Midwest states where doves are hunted, such as Kansas and Missouri, produce more doves per survey route than this state. Scientific research shows that regulated hunting has *no* detrimental effect on dove population levels.

Like most species of small birds and mammals, annual dove mortality runs high—40 to 60 percent. Hunting merely takes the

place of part of the natural mortality that would occur anyway. Dove populations are determined by biological and environmental factors not related to hunting.

Those who oppose a dove season are only fooling themselves if they think they are protecting Iowa doves from hunting. Iowa mourning doves migrate south each fall through areas that have the maximum dove hunting seasons. In fact, all states south of Iowa hunt them. Doves raised and banded in Iowa are being harvested in other states. Our banding results show that about half of the Iowa banded doves that are shot are killed in Texas. Louisiana, Florida, and Alabama are the next most important states reaping the benefits of Iowa dove production. About 20 percent of Iowa banded doves that are shot were killed south of the United States border. Even with these states harvesting doves banded in Iowa, there is no biological reason for protecting doves here.

Four years of research has clearly demonstrated that dove numbers in Iowa reach a maximum in the last half of August. The numbers of doves present in the state drop rapidly from late August through September. It is not unusual for doves banded in Iowa in the summer to be shot in Texas in September.

Some opponents of a hunting season argue that the dove represents the "symbol of peace". But the North American mourning dove is not the bird of biblical reference. The words dove and pigeon were used interchangeably in early times and our common pigeon is a closer cousin to the bird of biblical reference than the mourning dove.

So why don't we have a season on mourning doves in Iowa? Some blame the Iowa Conservation Commission. True, the Commission sets hunting seasons, but only on those species provided for by Iowa Code. Although one section clearly lists doves as game birds, legislative action would be necessary to change another section that does not include doves in the list of species on which the Commission may set a season. It is the only Iowa game species not included on that list. Numerous bills, sponsored or supported by the Commission, which would have resulted in an open dove season, have been placed before the State Legislature.

Maybe the Legislature is to blame? No way. Legislators measure the pros and cons of a bill by the amount of communication from their constituents on the subject. So far, the noise from preservationists and dove hunting opponents has been the loudest.

Now there's the culprit—the anti-hunter, right? Not really. Although relatively few in number, opponents of a dove season are adamant and vociferous. Regardless of the lack of validity in their arguments, they express their opinions to the legislature. So far, that opinion has outweighed that of the hunter who apparently does not know or care about what he is missing right here in Iowa.

For it is with the Iowa hunter that the real problem lies. A valuable resource, produced in large part in Iowa, is being harvested in other states to the tune of millions of man-hours of recreation, not to mention the dollars being pumped into local economies. During September, most Iowa hunters lazily dream of pheasant season and let a minority keep them from hunting the most abundant game bird in the country. Only those who are willing to travel out-of-state can enjoy their sport.

You can bet the folks in Missouri, Kansas, Illinois, and Arkansas don't mind. Iowa dove hunters are always welcome there . . . and so are Iowa doves. □



Photo Courtesy Missouri Conservation Dept.

Fishing The Raccoon River Below Sac City

By Lanny Miller FISHERIES BIOLOGIST

Photos by Roger Sparks

MANY IOWANS OVERLOOK the tremendous fishing potential that the rivers in our state have to offer. The Raccoon River, below Sac City, is one of the finest rivers for angling in Northwest Iowa. From its source in Buena Vista County, the Raccoon River flows southeast about 210 river miles where it joins the Des Moines River at the city of Des Moines. It is a well-defined stream with the river bottom composed of gravel, rubble and silt.

The most popular ways to fish the Raccoon River are bank fishing, wading and canoeing. While wading and bank fishing are old standbys for catching a stringer of fish on the river, canoe fishermen are growing in numbers. Except for periods of very dry weather, the Raccoon River has sufficient water depths to float canoes or small flat-bottom boats easily.

Channel catfish, walleye and smallmouth bass are the three species of sport fish most sought by anglers in the Raccoon River. If you have never fished for these species in a river, here are a few tips to get you started.

Brush piles, snags and undercut banks are good places to catch a stringer of catfish on the Raccoon. Catfish prefer the quieter sections of water and are seldom found in fast moving water, such as the middle of the river channel. Baits that consistently take channel catfish in the Raccoon River are nightcrawlers, stink bait, dead minnows, cut bait, grasshoppers and frogs.

Walleye are generally found in the deeper, quieter holes with early morning and late evening hours being the most productive. Holes below tall clay banks should not be overlooked. Leadheads and spinners are the most widely used artificial lures, while live minnows and nightcrawlers head the list of natural baits used.

The Raccoon River is well noted for its fine smallmouth bass fishing. Smallmouth bass ranging from one to two pounds are commonly taken from the deeper pools and brush piles that are found in the river. Smallmouth are also taken below riffle areas in the spring of the year as well as in the early morning and late evening hours during the summer months. Again, spinners and leadheads account for the majority of the smallmouth bass taken on artificial lures, while crayfish and minnows are the most productive live baits.

There are many publicly owned access areas on the Raccoon River. Some of these include Fairgrounds Park, Grant Park and

Haage Park in Sac County. In Carroll County public access areas include Hobbs Park, Bennett Access and Carroll County Access. Rainbow Bend is a popular fishing and canoeing access located in Calhoun County.

So the next time your favorite lake is crowded with people and the fish aren't cooperating, jump in the car and head for some of the finest river fishing in Iowa, the Raccoon River below Sac City.



GRASS CARP UPDATE: a subject of controversy

By Jim Mayhew FISHERY RESEARCH SUPERVISOR



OUR LAND IN IOWA IS BLESSED with a richness unsurpassed by any other place on this earth. Some say the Midwest region of this continent can produce food and fiber to feed and cloth a hungry planet. Likewise, our waters are enriched to a nutrient level that ranks with the highest anywhere. However, some of this richness also creates serious secondary problems for recreation management, primarily that for fishing.

As nutrients from the land reach our waters, dense stands of aquatic plants appear in shallow water. At their pinnacle they form a thick, impenetrable band around the entire shoreline out to a depth of 6-12 feet. Fishing from the shoreline is impossible and many times just taking a boat through this luxuriant growth is an unpleasant, disheartening task. Protection to small bluegill and crappie offered by this cover ultimately confounds fishery management, ending in small, thin and stunted panfish.

Attempts to control weed growth by mechanical and chemical methods have met with little success and in many cases, complete failure. Early in the 1950's some fishery experts started probing the use of a large, Asiatic herbivorous fish, the white amur or grass carp, for biocontrol of nuisance vegetation in lakes. Finally in 1963 grass carp were brought to the U.S. Fish and Wildlife Service

Experiment Station in Stuttgart, Arkansas from Malaysia. From that time on, a verbal controversy has raged within fishery circles between proponents and opponents of grass carp and it remains unresolved to this day.

Grass carp proponents seek a single, mutual goal; biocontrol of dense, nuisance aquatic vegetation by the fish as they consume large quantities of plants for food. On the other hand, opponents are genuinely concerned that some of the indirect consequences of widespread distribution of grass carp might be more detrimental to our waters than other exotic fishes, like German carp. In short, the cure via grass carp might be more dangerous to the environment than the nuisance vegetation. Their main argument reflects several concerns. First, escapement of grass carp into natural waterways could lead to widespread distribution into waters where vegetation is desirable. Second, unabated spreading through spawning and competition for food with young sport fish would occur (although records of natural reproduction outside their native range are extremely rare due to very restrictive spawning requirements). Third, water quality would be degraded by enrichment from large quantities of fish manure producing severe and long lasting algal blooms. And last, exotic fish diseases and parasites might be imported along with grass carp for which native species have little immunity.

The attitude of state fisheries agencies toward grass carp varies from regulations to outright ban of their possession to the stocking of numerous public waters. Iowa law does not forbid the importation or possession of grass carp, but their release is prohibited. They have been stocked in Red Haw Lake, Griswold Pond, Silver Lake (Delhi) and Cold Springs Lake for experimental biocontrol of vegetation and evaluation by the Fisheries Section.

Our decision to experiment with grass carp for aquatic vegetation control was predicated on several factors. Simply, we were squarely faced with a serious problem; so serious in fact, that



shallow water fishing in many recreational lakes was eliminated. Repeated effort of mechanical and chemical control invariably met with total failure. Without some sort of solution to this problem many lakes that offered vast fishing potential were being quickly reduced to useless, ugly eyesores.

By importing the first grass carp into North America, the U.S. Fish and Wildlife Service already made the decision whether they should be here or not. We had no input into making that judgement. Transporting these fish into Arkansas opened nearly three-quarters of the United States from the Appalachian to the Rocky Mountains to infestation by escaped fish via the Mississippi River watershed. And, escapement was inevitable. By 1975, more than 100 public waters in Arkansas were stocked with grass carp and they were reported in commercial fish catches in the Mississippi drainage from Nebraska to lower Louisiana and into Ohio, Tennessee and many connecting waterways. Commercial fish growers in Arkansas advertise grass carp for sale in several nationally distributed magazines. Ironically, many states *still* argue over whether or not grass carp should be released into natural waters.

Original research programs on grass carp were conducted exclusively in small earthen test ponds, tanks and aquarium because of the reluctance to release them into surface waters. Results generated from these studies seem wholly unapplicable to the real problem, since not many state fisheries resource agencies, including Iowa, manage waters of this type for public fishing. The gravest error that could be committed at this point would be to not evaluate the potential of grass carp to control nuisance vegetation.

On July 20, 1973, 550 one-year old grass carp were released into Red Haw Lake near Chariton. A dense band of aquatic vegetation covered the entire shallow water perimeter making shoreline fishing impossible after mid-summer. The lake had a history of fine early season bluegill and crappie fishing, and fair bass fishing. Escapement of grass carp from the lake into natural water courses was virtually impossible. Taken into final consideration before the stocking was the fact that in the event we created a "monster", the problem was reversible by eliminating the entire fish population.

The research was aimed at answering four basic questions. First, could grass carp control the massive submergent vegetation beds in Red Haw Lake? Second, would all plant species be eaten

by the fish? Third, what changes occurred in water quality? Last, what effects biocontrol by grass carp had on the fisher?

Three years after stocking grass carp into Red Haw Lake the fish average nearly 20 pounds in weight. Aquatic vegetation density in test plots has been reduced 80% from the density prior to stocking. Grass carp select some plant species more than others when all are equally available. When preferred species are gone they readily switched to others. The grass carp are nearly wholly herbivorous, with less than one-tenth of one percent of the stomach contents containing insect larvae. Fishing success increased in the three years by 40%. Last year, anglers caught 27,175 fish at Red Haw, which is 388 fish weighing a total of 150 pounds per surface acre. Not many lakes anywhere in the Midwest can boast of this success. Nuisance blooms of algae have not been a problem.

The most important unanswered question at this time seems to be what happens when all the aquatic vegetation is consumed at Red Haw. Speculation by the experts ranges from absolutely nothing to consumption of shoreline terrestrial plants. In the long run grass carp stocked at the density required for weed control might be only detrimental to themselves since they would probably lose weight to the point of starvation when the submerged weeds are eliminated.

There should be little worry on the part of the skeptical experts concerning natural reproduction of grass carp. Recently it was reported for the first time in this hemisphere in Mexico. Reproduction will not occur in Iowa for we do not have the strict requirements needed in our state. But, grass carp are very adaptable creatures, and natural reproduction will surely occur somewhere on this continent. It is merely a matter of where.

Perhaps only time will resolve the grass carp controversy and render its judgement on the wisdom of naturalization of this exotic fish species. At Red Haw Lake, grass carp have been a huge success for control of submergent vegetation that had not been achievable by any other means. Not a single detrimental effect from the stocking has been documented in three years of intensive research. From these results a cautious expansion stocking program to eleven other Iowa lakes was initiated. In some circles we were criticized for this approach, but to ignore the obvious benefits from the Red Haw stocking would be worse -- for there is nothing more sad than one with eyes and ears that will not see nor hear. □

Photos by the Author





YELLOW PERCH FISHING **in Iowa's Natural Lakes**

Photos by Ken Formanek



By R. H. McWilliams
FISHERIES RESEARCH BIOLOGIST

ON OUR NORTHWEST AND NORTHERN natural lakes region it's quite common to see large rafts of small fishing boats; or in winter, groups of ice shelters congregated near reefs, around beds of vegetation or in the larger embayments. Without doubt, perch fishing is underway! Fishing for the fast-biting yellow perch is enjoyed by anglers of all ages, year round. The characteristic "tap-tap" bite can clean a lure before the surprised angler can react. However, when perch begin to feed, action becomes fast and furious, with 5 or 10 fish caught in as many minutes not uncommon. Although the perch is not known for its tackle busting ability, it far surpasses most others in flavor and quality and is truly a gourmet's delight.

Yellow perch are found primarily in the natural lakes, but they also inhabit many man-made lakes and large streams. The highest populations are located in Spirit Lake, East and West Okoboji Lakes and Clear Lake. Historically, yellow perch rank near the top of the fish harvest in these lakes. In Spirit Lake, they ranked first or second in 17 of 21 years and in West Okoboji Lake, they were the most prevalent fish caught in 20 of 23 years. Spawning activity normally occurs shortly after "ice-out", when water temperatures are between 45° and 50° F. Fertilized eggs are contained in distinctive, long, ribbon-like masses and are usually laid in shallow water over sandy areas near bottom vegetation or other subsurface materials. Hatching generally takes between 12 and 21 days, depending on water temperatures. Young perch tend to congregate around beds of vegetation because these areas contain readily available sources of food and also provide the young protection from larger predators.

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There are two major fishing seasons on the natural lakes, open water fishing, from May to November; and winter or ice fishing, from December through February. The best months for seeking yellow perch are from mid-September through February. The next best, from late spring through early summer, with the mid-summer months normally the poorest. While most anglers will agree on the best time of year for perch fishing, the best time of day is another matter. Some anglers fish during the early morning hours; others during mid-morning but the majority prefer to fish from late afternoon to dusk, with perch rarely caught after dark.

Two of the most often asked questions are where and how to fish for perch. Adult perch school and feed along the edges of submergent vegetation, on the lee side of reefs and around large rock piles. These areas generally provide the best fishing year round, although good success is also reported from many areas of the lakes at different times of the year. During the open water season, one of the best ways to locate good fishing areas is to watch for the large rafts of anchored boats. But, if you're on your own, don't rule out the use of the newly developed fish locators. The use of contour maps can also help to locate likely looking areas. Although the majority of anglers fish from boats during this season, fishing from the shore or docks is also excellent on occasion, particularly in the spring. During the winter or ice fishing season, a good method of locating popular areas is to look for groups of anglers, or concentrations of fishing shelters scattered across the lakes.

There are many methods of perch fishing, but two methods which seem to provide fairly consistent catches are jigging and cast-retrieve. Jigging for perch is by far the common method and is employed year round. Allow the lure to sink to the bottom, then slowly raise it between 4 - 12 inches. Then while fishing, occasionally jig or jerk the rod tip upward and allow the lure to settle back to the original depth. Often perch will hit the lure just as it comes off the bottom so it pays to be ready. A second method, the cast-retrieve is probably familiar to everyone. Cast about 10-15 yards, allow the lure to hit bottom, then retrieve the line slowly, jerking the rod tip upward every 2 or 3 turns of the handle.

A variety of tackle and baits are used, with favorites varying from fishermen and from season to season. Some anglers prefer to use a standard weight rod and reel, while others like a stout cane pole. Recently, ultra-light rods and reels have become common because the angler can "feel" the lighter bites of the perch and also it increases the fun of the sport. Lures change from season to season. Favorites during the spring and fall include the mini- or small leadhead jigs. The colors in the feathering range from solid black to solid white, with various color combinations in between. Regardless of the color of lure used, most seem to work best when baited. The best baits are silver wigglers, pieces of worm or crayfish, small minnows and at times a perch eye or piece of fish flesh.

The winter fishing season brings out the true hardy angler, who will fish regardless of the weather. The primary concern, other than bringing home a nice stringer of fish, is to keep warm. If dressed properly, ice fishing is a wonderful sport. Protection from the weather is also afforded by various types of fishing shelters or ice houses. These range from simple windbreaks to larger houses with heated interiors and nice chairs. Two additional pieces of equipment are necessary for ice fishing; a spud bar or auger for cutting holes through the ice and an ice skimmer for removing ice chips and for keeping the hole open while fishing. Most anglers also change to a short rod generally no more than 3 feet long, or use just a handline. The most common lure is a small metal jigging lure and again for best results it should be baited. Favored baits are silver wigglers, small minnows and perch eyes.

Perch fishing in Iowa's natural lakes provides year round angling enjoyment for fishermen of all ages. However you like to fish, from the shore or a boat, during fair weather or foul . . . yellow perch are waiting for the bait. Remember, freshly caught perch pan fried to a deep golden brown are second to none. □

Warden's diary

By Rex Emerson
Law Enforcement Supervisor

ONE OF THE THINGS I LIKE about being a game warden is that every day is a little different and you never know what to expect when you start out on a tour of duty. It was 8:00 a.m. when I went to work yesterday morning, a late start for this time of year. Even though I told my wife that I expected to be home in time for supper, she wouldn't believe it until she saw me. Being late for meals seems to go with the job.

The first thing was to take a live trap to a lady who had a squirrel in her attic. Next was to see a farmer about a beaver dam complaint. The beaver were not causing any real problem at this time so could wait till trapping season. In another area some wildlife cover that we planted last spring was inspected. It looked like almost all of it was growing. I then walked along the river bank checking some fishermen for licenses. One fisherman was complaining about the size of the mosquitoes. He said, "I saw one mosquito that had two wood ticks on it!"

At 5:00 p.m. came the unexpected. It was a call on the two-way radio that one of the officers in my district needed assistance. It was a 50 mile drive to get to his location. Two other Conservation Officers had also heard the call and arrived about the same time I did. We met in a wooded area off the road. The officer who called had reliable information that a group of men were going to seine a particular hole in the river. The place they were going to seine was a mile from any road. We spread out a county map on the trunk of one of the cars and located the bend in the river and some possible fields they might go through if they used vehicles instead of boats. Then two of the officers put a boat into the water and headed down river to the reported spot. I took the other officer with me and we brushed out the tire tracks in the gateways along the dirt road. Then we pulled into a county owned timber area, out of sight from the road. The officers in the boat soon called on their portable radio that they were in the area and had their boat out of sight behind a brush pile. The long wait started.

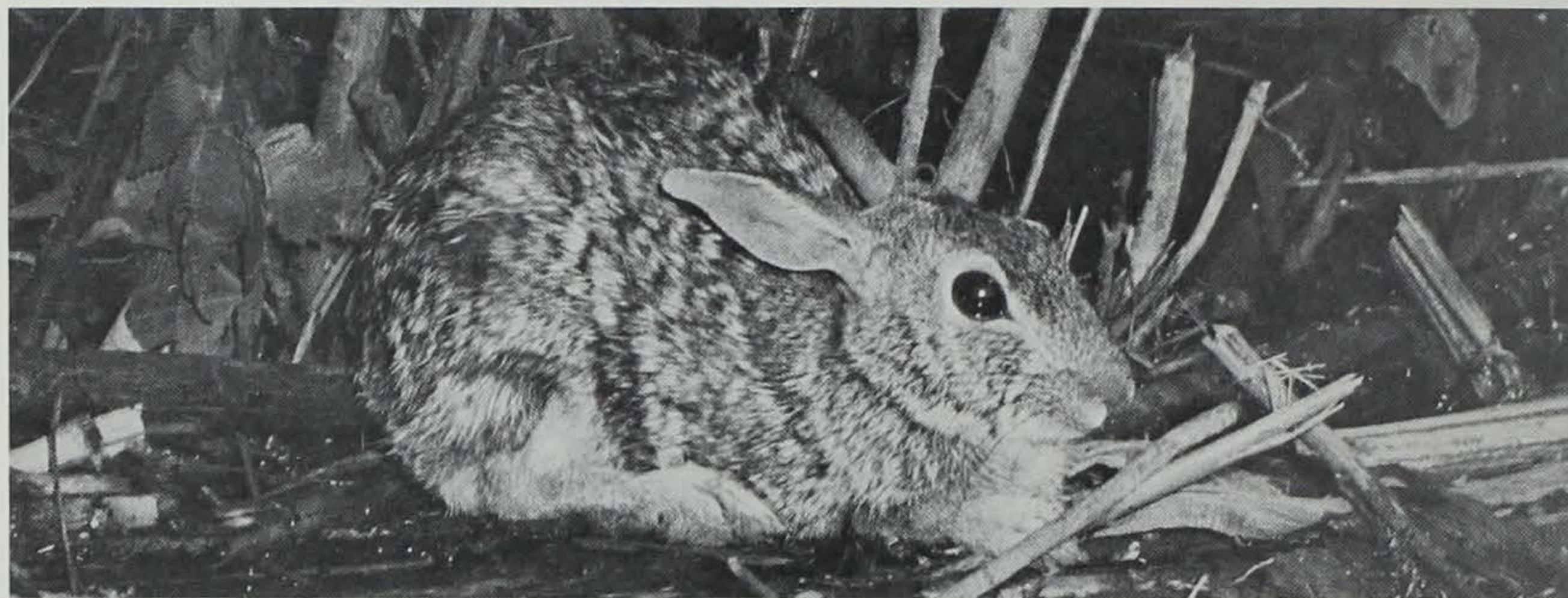
It seemed like it had been a long time since the sandwich I had eaten at noon. So we got the river bag out of the trunk of the car and opened a couple cans of beans and also found some crackers to eat with them. For dessert we had some little cans of fruit and some cookies. The water in the old canteen wasn't too fresh, but it was wet. A good game warden always has some food along.

We knew the information about the seiners was reliable. What the informant didn't know was what time they would be going. So, we waited. At 9:30 the officers who had gone down by boat called on the radio that they could see two sets of headlights coming through the field toward the river. We acknowledged the call and stood by for further reports. The next report was that it was a car and a pickup. A few minutes later they reported a fire was being built. A little later hot dogs were being cooked, and they could see eight men in the light of the fire. About 10:15 the officers reported that the men were going into the river with a seine and one man was standing on the bank as "look-out". We knew if we tried to take them now they would scatter like a covey of quail into the darkness. We decided to wait until they came out to the road.

It didn't take long to find the field entrance that had car tracks going in. It would be a good spot to catch them. The trail coming out was narrow, with trees on both sides, making it impossible for them to turn around. They had shut the gate when they went in, so we would have to stop when they got to it. We backed up our car so it

(Continued on Page 23)

RABBIT HUNTING: *Get after them now!*



By Donald Pfeiffer Wildlife Biologist

YOU DON'T NEED TO WAIT until the snow falls to hunt cottontail rabbits. In fact more rabbits are available to improve your success in September and October than are present in December.

Rabbits are second only to the ringnecked pheasant in Iowa game popularity. Approximately one million rabbits were harvested in 1975-76 by 120,000 Iowa hunters. Yet with more hunting pressure earlier in the fall, we could have doubled the harvest without reducing the overwinter breeding animals. Let's examine this further.

The cottontail is extremely important as a food supply as it is preyed upon by nearly every meat eater that walks, crawls and flies, including man. To understand how rabbits can flourish in spite of such pressure from predators, one needs to understand the rabbits reproductive capacity. Quite often, young born in the spring are able to bring off a litter of their own before the end of summer. Thus, under perfect conditions, it is possible for a pair of cottontails to build to a population of 36 rabbits by fall.

Rabbits, as with most wildlife, normally produce an annual surplus of young that far exceeds the supporting ability, or carrying capacity, of winter habitat. The more the surplus, the higher the mortality. This mortality begins as soon as the rabbit is born, but only becomes significant when crop harvest begins in late October. The vast cover available to the rabbit shrinks to fencerows, ditches and other non-farmed areas.

Research has shown that about 85 percent of all rabbits die or are killed each year — even if they are not hunted. Because of the high annual turnover, the surplus rabbit crop is ours to use or lose. Hunting allows sportsmen to harvest as much of the surplus as possible and salvage it for human use and recreation.

The average cottontail will spend his entire life in an area no larger than 10 acres. So you can imagine how crowded 36 rabbits would be when forced into an acre or two of roadside once the corn and soybeans are harvested, and the pastures are grazed short. This concentration makes rabbits easier prey to coyotes and fox. Increased carcasses are seen on the roads. The early season hunter can capitalize on this surplus and add meat to his table. A different type of hunting is required, but it can be more comfortable than trampling through the snow.

Rabbits are creatures of habit. If you recall seeing them in locations last summer, hunt those areas. Bunnies are nocturnal animals, but in early fall they are active before sundown and just after dawn. Hunting these periods will provide you the best opportunity at a rabbit.

A rabbit's superb natural camouflage offers it a degree of invisibility in winter, but the gray fur contrasts to the green, yellow and red of early fall. Hunt on the edges of good cover. Rabbits will concentrate in the first 50 yards of cover around the edge of an open field. An open bore shotgun is more satisfactory early to insure a hit in the heavier vegetation in which you will be hunting. Unless you are on an exact collision course toward a rabbit, it will often sit tight and let you walk by. Pheasant hunters know that coming to a stop and standing quietly often puts game out, but it seldom bothers a rabbit. Abrupt moves or the making of loud noises usually moves a rabbit.

If you jump a rabbit and fail to get a shot you'll likely have another chance. If a cottontail isn't really frightened it may make a quick run and then stop. Walk a zig-zag pattern across the exit path and you'll jump the rabbit again. Keep in mind that a rabbit will often circle. Two hunters can be successful by having one man follow the rabbit's exit and the second hunter await its return. Circles cover a smaller area in early fall due to the heavier vegetation.

All game should be cooled quickly once killed. This isn't easy in September or October. I suggest taking along an ice chest to put the cleaned rabbit into. Cleaning a rabbit as soon as it is killed and cooling it down will insure top flavor of the meat.

Get out your shotgun when the season opens and take to the field. Cottontails are available and ready to outsmart you. The exercise will also prepare you for the upcoming hunting seasons. If you are successful, don't leave the rabbit in the freezer, try this recipe:

Rabbit Parisienne

This recipe uses the new slow-cooking pot. You'll need:

*1 or 2 rabbits, cut in pieces
Salt and Pepper
Paprika
1/2 cup dry red wine (optional)
1 cup sour cream
1 10 1/2 ounce can condensed cream of mushroom soup
1/2 teaspoon Worcestershire sauce.
2 teaspoons instant minced onion.*

Sprinkle your rabbit pieces with salt, pepper, and paprika. Place them in slow-cooking pot. Mix your red wine, soup, sour cream, Worcestershire sauce, and minced onion until well combined. Pour this over rabbit. Cook on your low heat setting for 7 to 8 hours. Serves 3 to 6.

AQUATIC ACOUSTICS



By Vaughn Paragamian

FISHERIES BIOLOGIST

Photo by Betsy Paragamian

"*QUIET*", the old man shouted, "*you'll scare the darn fish.*" I heard those words many times as a young boy but I never gave them much heed. How could a fish hear when they don't have any ears? As with many other things in life, I later discovered the old man was right.

Surprising to many is the fact fish can hear and hear with precision. Even when a fish's vision is obstructed by turbid water it can still hear. In fact, some fish can hear sounds we cannot hear. Each sound has a different meaning; danger, food, mating noises or communication signals. Each meaning in turn creates a corresponding response, so it is to the fisherman's advantage to understand how and what fish hear.

Before we go any further, let's review our physics. Sounds are vibrating molecules that pulsate at different frequencies or cycles, which determine loudness. The speed of sound is regulated by the density of the medium in which it travels. The denser the medium the faster the sound travels. For example, sound travels four times faster in water than air.

Fish have three different yet related organs which detect sounds. The most important organs are the inner ears, called the membranous labyrinth by scientists. The inner ear is described as a purse-like organ with three pockets and interconnecting canals. They are buried on either side of a fish's head, in a similar position to our inner ears. Each pocket has a bone called an otolith and each otolith has a name; sacculus, saggitta, and asteriscus. A membranous material surrounds each otolith and connected to this material are sound sensitive cells called neuromasts. Fish do not have ear drums but a sound underwater traveling to a fish is transmitted through skin, flesh, and bone to these sensitive cells that in turn send messages to the brain.

Scientists believe the inner ear is a specialized part of the lateral line system. The lateral line can be seen on most fish along each side, extending from the head to the base of the tail. Lateral lines can be seen on bass, carp and trout. The lateral line consists of a series of canals with small porelike openings distributed along it. Neuromasts are also housed within these pores to transmit signals to the brain. These cells are especially sensitive to low frequency sounds, from 200 down to 10 or 15 cycles. Our ears cannot hear the lowest of these frequencies.

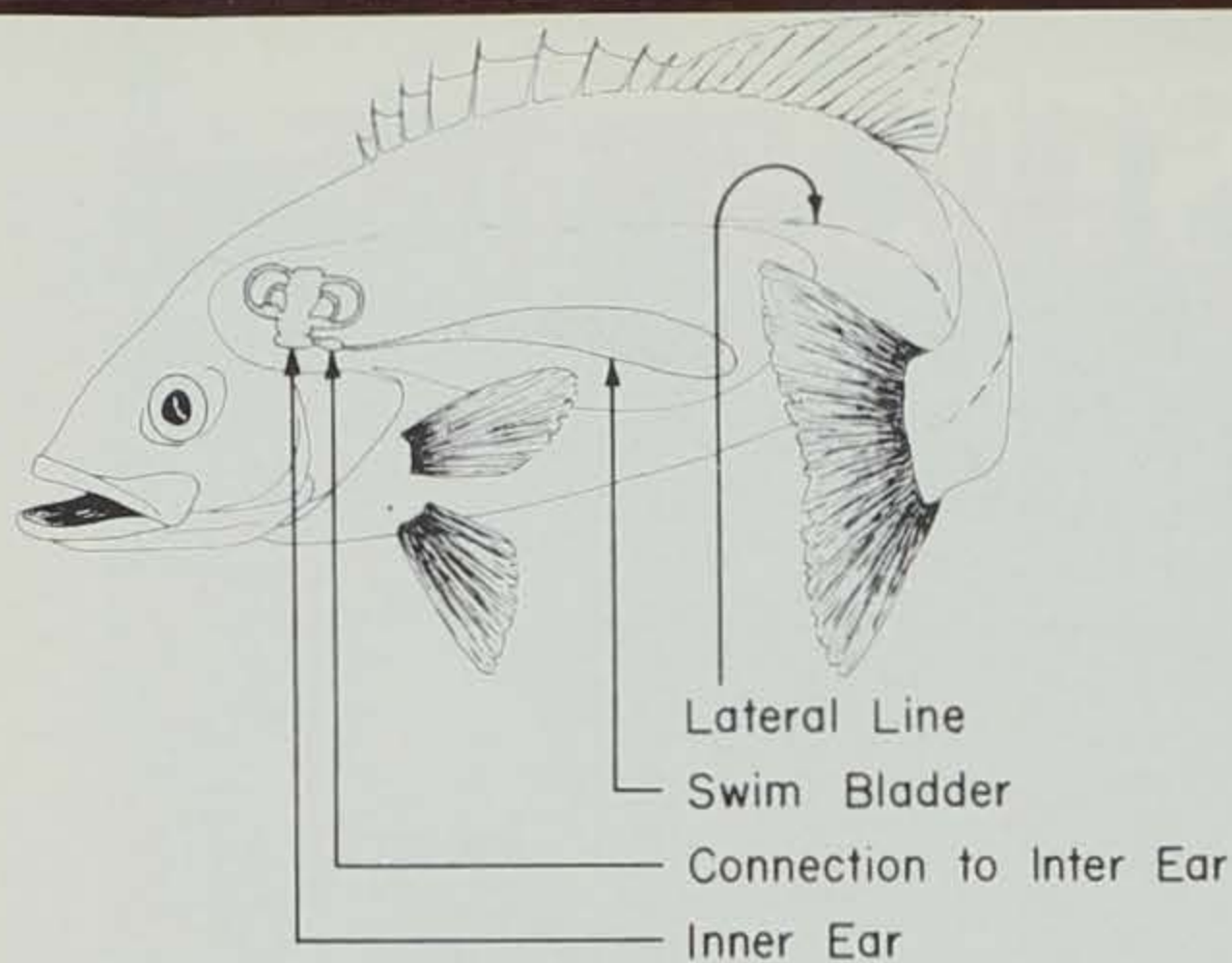
Some fish that have extremely acute hearing have a connection between their inner ear and the swim bladder. The swim bladder is a gas filled chamber found in most fish and helps the fish maintain balance. This bladder also serves as an aquatic microphone, resonator and amplifier. Because fish flesh is nearly the same density as water, sounds can practically pass right through them, except through bone and the swim bladder. Vibrations in the water are transmitted to the bladder and sent to the inner ear.

With two hearing systems, and a third in some fish, it seems a fish could be confused as to which system to use. But this is not the case. Sound reception by the inner ear and lateral line system are distinctly specialized.

The lateral line receives near-field sounds. That is, sounds of low frequency, 10-200 cycles. Near-field sounds are created when molecules of water are displaced by strong pressure waves. These sounds carry for a short distance 20 to 50 feet. Fish can pinpoint the source of these sounds. Water forced along disturbs the neuromasts in the direction of their travel revealing the direction of the source. Humans can hear sounds underwater but we are incapable of determining their source.

Far-field sounds are caused by pressure waves that force water molecules to vibrate back and forth but do not move the water in any particular direction. These sounds can travel many miles and are sensed by the inner ear. Although fish can hear these sounds from 200-10,000 cycles they must make a search pattern if they wish to find the source.





Now that we're acquainted with the hearing ability of fish, how can we use it to our best advantage?

Fish are constantly aware of what is going on in their underwater world. Sudden or unusual disturbances can frighten them or make them more alert and harder to catch. Normal talking, for example between fishermen in a boat, cannot be detected by fish since 99.9% of sounds originating in the air are deflected by the water's surface. But, sound can be transmitted to the water from the ground, rocks and boat hulls. This means, be careful when handling gear or moving in a boat, some fishermen put indoor-outdoor carpeting in their boats to avoid noise. Also, tread lightly when approaching an area along a stream bank you want to fish.

How about motors? In many situations fish are known to flee from outboards in shallow water, in deeper water fish are more secure and are less likely to be frightened. Electric motors are less offensive to fish but squeaking oars can alert fish. On the other hand, in areas with heavy boat traffic, underwater observers report fish seem to be more accustomed to the disturbances. Some experienced fishermen will motor within a 100 feet of their favorite spot and then paddle in the rest of the way. Paddling a boat is by far the best way to approach a hot spot.

Injured fish send out distress vibrations that stimulate a feeding response in predators. These vibrations are created by a swimming action much different than that of a normal healthy fish. For this reason live bait fishermen are usually very successful. A hooked minnow will swim in an awkward manner and attract predators. For best success keep a live minnow on your hook or give the bait action by jiggling.

Most of the better artificial lures immitate the flutter and flopping sounds made by injured or dying minnows. When using these lures cast just beyond a likely looking spot. If you drop the lure right on top of a hiding fish you are very likely to startle him. After a surface lure hits the water, let it rest a few moments and then retrieve it. Fish use their lateral line systems to find surface lures but shift to sight after it is spotted.

A fish can make sounds by two different methods. Mechanical type sounds are usually made involuntarily during activity. These include noises made during chewing or grinding of food items, spawning activity, feeding on the bottom, and by movement of muscles and joints.

Biological sounds, the second type, are sounds intentionally made by fish for communication purposes. Some fish grind their pharyngeal teeth, teeth in the throat, while others make a drumming sound by muscular contraction around their swim bladder. Ocean striped bass can make a drumming sound with their swim bladder. Perhaps the freshwater drum, or sheepshead, is the most familiar aquatic noisemaker in Iowa. Researchers believe the freshwater drum produces sounds by contractions of muscles against the walls of the swim bladder during the spawning season. These sounds are often audible to fishermen in boats.

So the old man was right. Fish can hear, so next time you want someone in your boat to be quiet don't get mad and stomp on the floor "because you'll scare the darn fish." □

The LOESS HILLS of Western Iowa

By Neil Heiser
Wildlife Biologist
Photos by the Author



TO THE CASUAL OBSERVER traveling on the Missouri River floodplain, the most prominent, visible geological formation is the adjacent bluff edge. Rising several hundred feet from the level Iowa floodplain, this formation has the distinction of being unique in both geological origin and natural setting.

Referred to as the loess hills of Western Iowa, this area offers a type of soil found in quantity only in one other region of the world — China. This loess soil is a windblown silt which mantles most of Iowa's landscape. The uniqueness of these hills lies in the fact that it is quite rare for this windblown material to create a landform as spectacular as the Missouri River bluff edge. This loess soil, ranging from 60 to 100 feet thick, was formed during a 15,000 year period which ended approximately 14,000 years ago according to a report by Neil F. Salisbury and Ronald Dilamarter to the Iowa State Preserves Advisory Board. After being deposited by strong winds, the soil went through a pronounced period of erosion roughly between 1,000 and 7,000 years ago, creating the steeply sloped and extensive ridges found in the area. This erosion, continuing to the present time, is an ever-present and significant characteristic of loess soil.

Because of the unique natural characteristics found along these bluffs, an effort was made by the Iowa Conservation Commission in 1973-74 to acquire a portion of this area. Under the "Open Spaces" program established at that time by the State Legislature for the purpose of preserving such areas, over 2400 acres were acquired as a wildlife management area.

Located north of Turin and 2½ miles west and north of Castana in Monona County, the Loess Hills Wildlife Area preserves some of the most spectacular bluff ridge and valley topography in the region. Over four miles long and up to two miles wide at its broadest point, the area provides as its primary objective, a diversity of cover and habitat vital to a large variety of wildlife species. This diversity varies from burr oak timber to open stands of native prairie. In the more level portions, small cropfields lend themselves to the interspersed cover types most productive to wildlife.

The Loess Hills Wildlife Area forms an interesting combination of plant communities. Prior to the settlement of the area in the late 1800's, the region was predominantly native prairie. Tall grass prairie species, including big bluestem, Indian grass, and switchgrass, were probably common in the valleys and on more fertile land. Dominating the drier slopes and ridge tops were

species including little bluestem and side oats grama. Few trees were present in the area due to periodic wildfires. As man settled the region, fire became less common. Trees and shrubs, which formerly were suppressed by fire, began to invade this sea of grass.

Burr oak timber, which is now dominant on many of the loess slopes, began to gain a foothold between 70 and 100 years ago. Red cedar, also common to the area, was a more recent addition to this timber invasion. Many of these cedar appear to be less than 40 years old. This succession from prairie to timber has continued and probably accelerated in the last few years.

Wildlife has responded to this successional change as well as to management practices on the area. Pheasant, bobwhite quail, cottontail rabbit, fox squirrel and white-tailed deer are among a wide variety of species common to the Loess Hills Wildlife Area. A great assortment of bird life is also present and is reflective of the variety of cover types. Coyote, ground squirrels, opossums, striped skunk, badger and raccoon are common mammals.

Management of the area for wildlife is the primary objective of the Iowa Conservation Commission for the Loess Hills tract. Wildlife management techniques utilized include the elimination of grazing; selective grass seedings and shrub/tree plantings; controlled burning on selected sections of the area to maintain an open prairie grassland and reduce shrub and tree invasion; and an agricultural program based on small cropfield size, rotations of hay, sorghum and corn, and sound soil conservation practices. The resulting undisturbed nesting and winter cover interspersed throughout the area has created optimum conditions for the survival and reproduction of various wildlife species.

Uses by the public on the area include a variety of recreational possibilities. Good county roads and parking lot facilities provide easy access into portions of the tract. In order to prevent erosion of the steep, highly-erodable slopes and to provide for a quality recreational experience, no vehicles of any kind are allowed in the interior portions of the area. Public use centers on hiking, bird watching, hunting, fishing, wildlife photography, nature study by individuals and school groups, and cross-country skiing.

The Loess Hills Wildlife Area, being one of the larger public-use areas in western Iowa, offers the varied topography and plant communities needed to enjoy all of the above activities. Its unique geological history coupled with extensive undisturbed timber and grassland tracts make it a valuable addition to Iowa's wildlife management and outdoor recreation program. □



CLAMMING THE MISSISSIPPI RIVER



By Gary L. Ackerman Fishery Biologist

Photos Courtesy of Florence Lessard, Prairie Du Chien, Wisconsin.



Photo by Jerry Leonard

HAVE YOU EVER HEARD of monkey face, pocket book, mucket, lady finger, pig toe, fawns foots, warty back, three-ridge, washboard, ebony shell, sand shell, or black sand shell? Perhaps not. They are all common names of some of Iowa's freshwater mussel, or clams.

Clams are one of many natural resources of the vast and bountiful upper Mississippi River. Once an important industry

Clam shaker separates meat from shell.



was based on abundant clam populations. As time passed after the impoundment of the river by closing dams the clams were more or less forgotten except perhaps for use by trotliners as catfish bait. Now conservationists are taking a new look into the management and well-being of one of our little known or cared about resources.

Clamming As A Business

At the turn of the century clamming was a flourishing business for river people. Clams were raw materials for the production of pearl buttons with the wastes being ground for poultry grit. The first pearl button factory was established in 1892 at Muscatine, Iowa. Many thousand tons of clams were processed during those peak years as the industry expanded up and down the river. In the early years river-run clams sold for an average of \$15.00 per ton. Select species like sand shell which were cleaned and graded brought \$120.00 per ton. Other valuable shells such as the washboard, three-ridge, ebony shell and maple leaf brought up to \$80.00 per ton. Freshwater pearls added to the excitement for pearl buyers plied the river towns seeking those special sized and exact lustre pearls for making necklaces. If one was lucky enough to find that precise pearl needed to complete a necklace, the clammer had bargaining power and sometimes got over \$2,000.00 for a single pearl.

Then plastic came. Plastic buttons were superior in quality and they could be manufactured cheaply. Pearl buttons went out of style and the industry could not compete with the cheaper plastic buttons so the clamming industry folded about the time of World War II. It was the end of a very special era. Oldtimers still recall the days of clamming. Some vividly tell tall tales of outwitting pearl buyers or of taking a chance and buying a "pealer" hoping a good pearl lied beneath its flaking layers of nacre.

Clamming revived in the 1960's in the Mississippi River drainage system. It was due to an advancement in the artificial pearl culture industry of Japan. Kokicki Mikimoto developed a way to artificially seed oysters with a nucleus made from the nacre (mother-of-pearl) of freshwater mussels shells. Select shells are sent to factories in Japan where the thickest portion of the shell is cut into strips, these strips into cubes. Then the cubes are ground into round pellets, polished with jewelers rough, examined for imperfections and seeded into oysters. The mother oyster is cultured from one to five years with it depositing about .01 inch of

nacre around the nuclei. At the proper time, usually in the winter of the third year, the oysters are removed from cages and the cultured pearls are removed. The results are the beautiful and simple strings of pearls so prized by women throughout the world.

Clamming of today is in no way comparable with the clamming of yester-year when the industry was at its peak and pearl buttons were the rage. The shell market has developed into a very special one which utilizes only the large size, white colored and thick shelled species. Large quantities of shells are not required by the cultured pearl industry of Japan so the demand for shells is low overall. Generally prices have remained relatively low when compared with todays inflated economies. Commercial buyers at Prairie du Chein, Wisconsin may pay a clammer only \$88.00 per ton (wet weight) of select shells over 3½ inches in size. The species which typically comprise the catch are three-ridge, washboard and some maple leaf and pig toe. High quality shells such as the ebony shell and sand shells are no longer abundant in the Mississippi River. River-run shells are not in demand, and when marketable, they may sell for only \$20.00 per ton. Some limited use of these is being made for mother-of-pearl inlays using acrylic plastic molds for production of table tops, lamps, and other novelties.

Iowa's Clams

Clams are found on the bottom gravel, sand and mud substrates of many Iowa's rivers, lakes and streams. In the Mississippi River those commercially valuable clams congregate in relatively large masses commonly called "clam beds". They typically are found in the flowing water at relatively shallow depths along channel borders, in sloughs, and in chutes. The beds may be several feet deep with live and dead clams intermixed. The beds may range in width from several feet to many hundred feet wide and sometimes extend several miles where suitable and stable habitat exists.

The clam's soft body is encased by two hinged shells which open to allow the animal to respire, reproduce and to eat and closes for its protection. Clams are relatively immobile as they slowly move about by expanding and contracting a fleshy foot that extends through the bottom portion of its shell. Two siphons are extended from the front and rear of its shell. One takes in water and food organisms and the other expels water and waste products. The incoming water passes through its gills and mouth to supply it with oxygen and food.

(Continued on Page 22)

Clammer attends trail of clam hooks.



FORESTS

(Continued from Page 3)

If we are to protect our forests and maintain their ability to produce clean water, then we must protect the leaf litter from fire and grazing. The danger from fire is obvious. Grazing by cattle and other domestic livestock can upset conditions within the litter layer. As a cow walks around in the woods she crushes the litter into finer particles, causing them to oxidize and decompose at a much faster rate. Grazing also causes compaction of the soil below the litter layer and reduces the rate at which water will filter into the soil. This results in increased surface runoff, which in turn carries away some of the litter layer, which in turn leaves the soil even more exposed to compaction from the hoof action of livestock. This cycle advances quite rapidly, with the litter layer virtually destroyed in many cases in a matter of weeks. Most Iowa forests are quite sensitive to livestock, with the siltation load rising dramatically with the introduction of livestock. To make matters worse, the forest is often slow to recover and the landowner interested in caring for his forest is well advised to seek professional forestry help.

FOOD AND FUEL have been provided by the forest throughout man's tenure on earth. Man, when given the choice between the forest and the great grasslands, has usually chosen a place with access to both. The forest is much more than an area vegetated by trees; it is the sum-total of all living and non-living things in that area. Birds, reptiles, mammals, fish, roots and seeds were primitive man's food source; found most abundantly at the forest's edge. Modern man's reliance on the forest for food and fuel is greatly diminished, yet even today at least half the world's population relies on wood as their primary source of energy.

SHELTER is an essential part of our existence and it is, by and large, constructed of wood. When measured in terms of energy, wood is by far the most efficient building material in common use today. It requires at least 6 times more total energy to manufacture a building from steel, (39 times more energy for aluminum) than is required for wood construction. Wood is also more desirable from the standpoint of the amount of pollution caused by the manufacture of products and the cost of the abatement of that pollution. The cost of abatement of pollution (air and water) only causes a 2% increase in the cost of production of lumber as compared to a 9% increase for steel, a 24 to 48% increase for concrete products, and a 28% increase for aluminum. It is obvious that in an age of energy and environmental concern wood will see even wider use in the construction of our shelter.

The forest, if properly used, can sustain man for countless centuries. We now have 2.5 acres of commercial forest land per person in the U.S. That figure will drop to 1.9 by the year 2,000 just from increased population. Of that total 55% is contained in small privately owned forests, which on the average have the potential to double their productive yield. Yet it is this same segment of our forest which is most vulnerable to deforestation for competing land uses. Almost all of Iowa's forests are privately owned. Despite the fact that Iowa has the potential for having some of the highest quality hardwood forests in the world, Iowa has lost 40% of its commercial forest acreage in the last 20 years.

Modern man must learn to live in harmony with the forest, not to harshly dominate, but to use with measured wisdom. □

By Dale Stufflebeam

WE LIVE in a modern Prometheus Age where technological progress in agriculture, industry, transportation and other conveniences we call necessities are adversely affecting the orderly processes of nature. We denude our lands of precious vegetative cover needed to stabilize the soil, prevent soil loss through water and wind erosion and provide habitat so the wild creatures can coexist in this modern age.

We alter our waterways and pollute our lakes and streams through soil loss, human and industrial waste and chemical use that creates an imbalance in the ecosystem.

Man, by his own efforts, cannot make the rain to fall, produce a blade of grass or a tree. He cannot create a fish egg; make the egg hatch; or produce the food to feed the fish.

Man must use his technology to enhance the environment. In his limited capacity he must correct the abuses and effect changes which will expedite the processes of nature.

Fish management can best be described as the manipulation of fish species and habitat to provide desirable fishing. A balance must be maintained between the predator (carnivorous or flesh eating species) and the forage species which feed on insects. Well balanced fish communities are found in newly stocked and renovated waters. It is relatively easy to achieve a balance between predator and prey species in new populations, or by selective renovation of target species in established fish populations.

To maintain this balance requires the fish manager to be constantly alert to environmental and species composition changes which can alter this balance. Fish are very prolific and can produce more offspring than the food supply will support. Under good water quality conditions, favorable spring water temperatures and reasonable angling pressure, a desirable balance is maintained. However, nature does not always provide favorable conditions, especially during the spawning period.

The predator fish (largemouth bass) spawn in early spring and are vulnerable to the elements of nature. They spawn in shallow water during the period of heavy rainfall when silt laden surface waters enter the ponds, lakes and streams. The unstable weather conditions produce fluctuating water temperatures which can seriously affect the egg hatch and food production which the young fish need for survival. When the predator year class has been reduced or eliminated by these adverse conditions the prey species (bluegill) which spawn over a longer time period will reproduce in great numbers and cause an imbalance in the fish community.

If the bluegill numbers are not controlled by some method at this time, they become overpopulated and stunting occurs. Bluegills in need of food rob the nests of largemouth bass and suppress the successful reproduction of the predator species. The production of bluegills continues to dominate the fish community and further deterioration in the quality of the fishery is the result. A fish renovation project is usually initiated to restore a balanced fish population.

The condition described can be compared to a livestock operation on the farm where a scarcity of food affects all animals within a confined area. This condition is not corrected by adding additional animals, but by reducing the numbers in proportion to the food available.

Where prey species are the problem a successful fish renovation can be accomplished by the use of antimycin. This chemical is selective in the elimination of small or stunted bluegills and crappies, leaving the larger fish and catfishes unaffected and available for angling.

Partial renovation of a fish population (to remove small pan fish by the use of antimycin) is dependent on the accurate determination of the volume of water to be treated and a pH level of 8.5 or less. Lower pH levels will extend the toxic period to give an effective chemical renovation. At pH levels of 8.5 or more the chemical breaks down rapidly and may degrade to below toxic levels before an adequate exposure time has elapsed.

Fish Renovation



This chemical is used in p.p.b. (parts per billion) at standardized concentrations and will effectively eliminate fish by size and to some extent by species. If applied at proper concentrations under controlled conditions the chemical action is irreversible in the fish.

Unfortunately partial renovation projects may give only temporary relief to a fish imbalance. There is always the possibility of a population explosion by the target species which remain, or by a residual population of another undesirable species before the predator species can increase in numbers and restore the balance. Other species which may cause problems are bullheads, carp, buffalo or some other rough fish species that will dominate the species composition and require complete renovation of all fish present.

Complete renovations are made by the use of rotenone. This chemical comes from a South American plant and is toxic to coldblooded animals only. It may be applied in powder or liquid form. The powder is not readily soluble in water so the liquid form is preferred. An accurate determination must be made of the volume of water to be treated and the water temperature should be above 65° F. The higher the temperature the better the results.

Rotenone is applied in p.p.m. (parts per million). 2.7 pounds of the active ingredient applied to one million gallons of water gives one part per million. One p.p.m. will give an effective kill on most fish species, but it is necessary to treat at two to three parts per million to eliminate some fish species. Bullheads may require an even higher concentration, especially if the water is turbid.

The toxicity period of the water from either of the chemicals is of short duration and new fish can be stocked in about two weeks. The water may be tested for toxicity by placing some live fish in a container in the water for a twenty-four hour period. If these fish survive, the water is suitable for stocking.

A successful renovation project will restore a lake to good fishing. Unfortunately the cause of the imbalance may reoccur, which will require a repeat renovation at some future date.

The Fish Manager cannot control the elements of nature, nor can angler preference and pressure be predetermined. He must rely on

periodic evaluations of the fish populations and angling success to guide his fish management efforts. □

Photo by Don Kline



Stunted bluegills should be eliminated.

Bass over nest needs good water conditions.



Photo by Jerry Spykerman

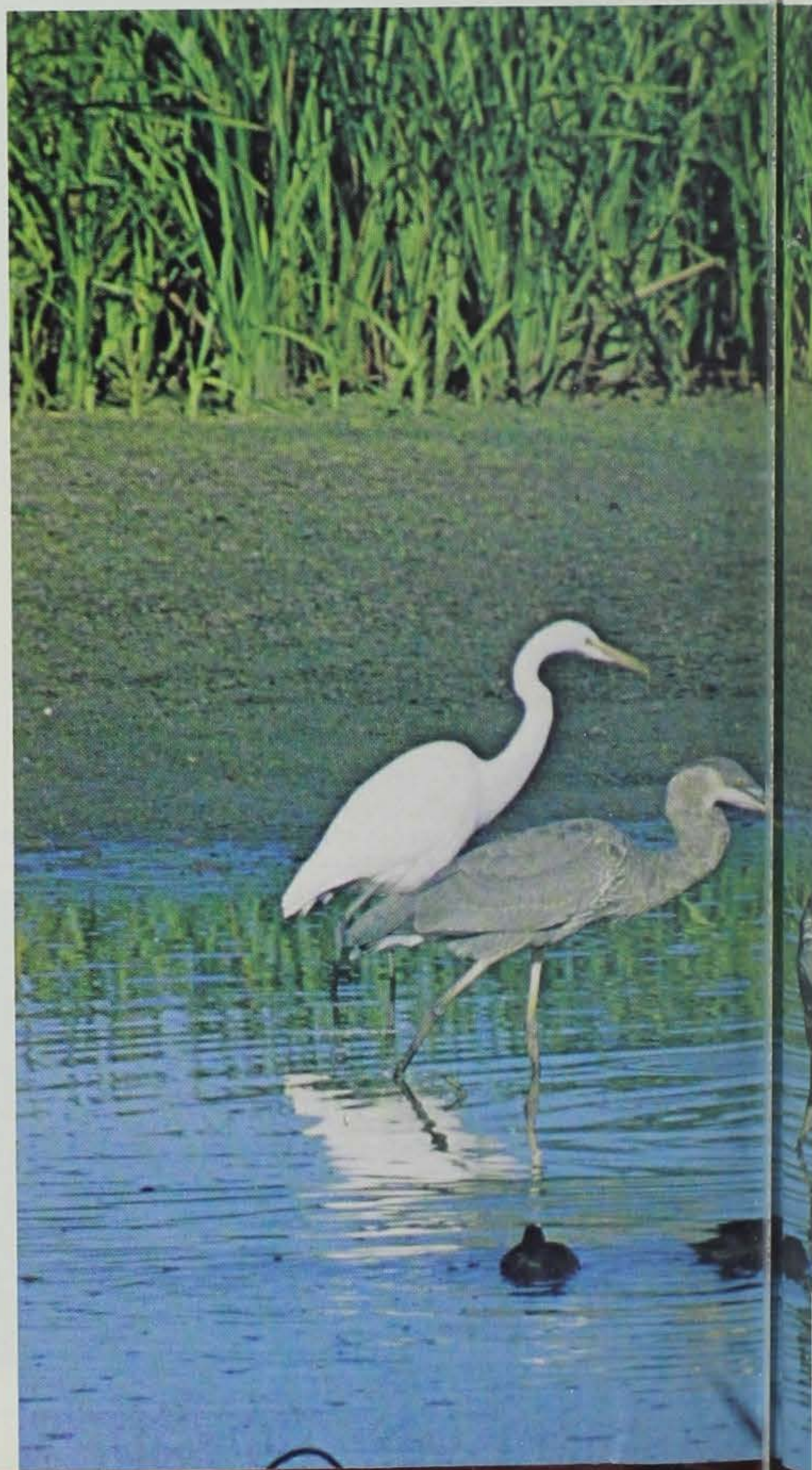
THE MAQUOKETA UNIT contains a wide belt of croplands in central Iowa blending into the rough unglaciated timberland of Northeast Iowa. The Unit is comprised of Benton, Linn, Jones, Jackson and Dubuque Counties. Benton and Linn Counties lend themselves to gently rolling cropland with the Cedar River flowing through both. Low income floodplain ground and the timbered slopes on either side of the Cedar River provide excellent wildlife habitat as well as the brush found along most creeks draining into the Cedar. One unique area on the River near Vinton, Iowa was once known as the Vinton Bogs. It is now entitled the Dudgeon Lake Wildlife Area. It consists of 1150 acres of unique meanders, oxbow lakes and lowland timber along the Cedar River 1½ miles north of Vinton. Migrant waterfowl species use the area heavily as well as an impressive resident woodduck population. Approximately 22 ponds and sloughs, all with their own name, can be found within the confines of the Dudgeon Lake Wildlife Area. No great expanses of water exist but when it comes to waterfowling, it is a pass shooters and jumpshooters paradise. Mallards and wooducks abound in the flooded timber. Fall peaks regularly find 1000 ducks using the area each day. Excellent deer hunting, squirrel hunting, quail and pheasant hunting exist as well as good fishing. An active timber management program is in progress to improve the areas carrying capacity for deer. Remember when you visit the area - it may not appear to be a wilderness when you arrive but take a map and compass if you venture into the area. It will save valuable time.

Jones County contains an interesting marsh that would make a waterfowler proud. Here lies one excellent wetland that has not been drained over the years. Three hundred and thirty-six acres have been acquired by the Conservation Commission. The area is named Muskrat Slough and 240 acres are open water acreage meaning the marsh attracts excellent numbers of snow and blue geese, Canada geese and rafts of diver ducks. Peak day populations in the fall reach 100 blue and snows, 100 Canadas, 2000 mallards, and 2000 scaup. Wildlife management efforts are going on in an attempt to increase resident teal and wood duck nesting. Nesting boxes have been installed for woodies, small potholes are being blasted open in the heavy cattail vegetation to serve as loafing areas for broods during the summer. Experimental native grass plantings are being sewn as well as occasional prescribed burns over the existing vegetation to stimulate new growth. Muskrat trapping proves to be a profitable venture on the area with roughly 100 animals being taken by only one or two individuals each year.

Fifteen miles north of Muskrat Slough will find a completely different state owned wildlife area that has just recently been acquired. It is known as Indian Bluffs. Its name is derived by the sheer, limestone bluffs found above the banks of the Maquoketa River. Four hundred and ten acres of forest land make up the Indian Bluff complex. A unique column of limestone in the northwest corner of the area known as Chimney Rock gives a new visitor a first hand view of the rugged terrain. The area lends itself to excellent deer hunting. The creeks and small openings within its boundaries provide ideal bow hunting and the choice of trees for a stand is limitless. Ruffed grouse have not been officially documented yet but residents in the area have been describing birds flushed in the timber that fit a ruffed grouse description. If any are sighted please contact the Maquoketa Unit biologist so that a thorough follow up can be made. It could safely be said that the Indian Bluffs wildlife area is the most remote wilderness in Jones County. That makes it worth visiting if you are a hunter, fisherman or backpacker. It means one other thing to the Conservation Commission. The area may be able to support wild turkeys. Present plans are to release enough wild trapped adult birds to allow brood production the first year. Wild turkeys are a deep forest dweller and require near complete isolation the first year or two following a release. Consequently, if you happen to see or hear any wild turkeys during a visit to the area, quietly report it to the Unit biologist and consider your encounter an exciting secret for you to know and others to find on their own. If you intend to visit the area, an access road and parking lot can be found in the northeast corner of the area.

MAQUOKETA Wildlife Unit

By Bob Sheets
WILDLIFE MANAGEMENT BIOLOGIST



Travelling east into Jackson County will eventually lead you to the mighty Mississippi River and an impressive list of wildlife associated with it. One of the state's largest wildlife areas can be found north of the small town of Green Island. The area is known as the Green Island Wildlife Area and covers 2912 acres of Mississippi bottomland. Needless to say, the bottomland floods frequently and provides excellent waterfowl hunting for thousands of east central Iowans. Approximately 8 bayous and sloughs provide waterfowl resting areas as well as excellent panfish and bass fishing. The area is surrounded by a flood control levee which provides ideal foot access to most of the area. Because of its size, it too is a wilderness and ample time must be allowed when getting to and from hunting or fishing areas. Several hundred acres of cropland lying in the

Ken Formanek



center of the area act as natural bait sites for Canada geese and many duck species. Many duck hunters benefit from this arrangement every fall. Two drainage ditches, a long narrow slough entitled Snag Slough and three lakes known as Blakes Lake, Densmore Lake and Fish Lake provide boat access to much of the area during the fall hunting season. Plans are to increase the size of several winter wheat fields on the area to attract even more geese.

The northwest quarter of the Green Island Wildlife Area supports an alert and healthy herd of deer. Many deer hunters venture into this remote area each winter and return with their tag on a deer. It is a rough area to hunt due to its flat terrain and fallen and rotting timber. But a little savvy can usually find the phantom Green Island deer herd.

If any area in the Maquoketa Wildlife Unit amply rewards the muskrat trapper, the Green Island Area far surpasses the rest. Last year (1974) approximately 2500 animals were harvested yielding roughly 20 trappers an estimated \$6500.00.

Once you have found your way back to the Great River Road, turn and proceed north to Bellevue, Iowa. Once there, turn west and pass through town to the northwest and begin an expedition up Paradise Valley. This name was given to the Big Mill Creek drainage by Captain William Potters family in 1830 who were some of the first inhabitants in Jackson County. The creek was so named because of its large floodplain walled in by 250 foot bluffs on either side. Northwest of Bellevue is a newly acquired forestland known as the Big Mill Wildlife area. It is 507 acres in size and is comprised mainly of upland timber, one small creek, and the Big Mill creek itself flowing directly through the center. Besides native brown trout in the spring fed streams the forest supports a healthy herd of deer. Raccoon and squirrel are abundant since much of the timber is mature. Recent cutover areas on the ridgetops are sprouting thick stands of aspen - highly desired by ruffed grouse and woodcock as well as deer. Experimental root cuttings from aspen transplanted to many sites on the area will hopefully increase all three of these forest game species. One access road and a parking lot can be found on the north edge of the area. From this point on it is footwork only for the hunter and fisherman. A reliable bridge takes you over the streams to an impressive and remote area. If you want a first hand idea as to what wildlife is on the area, check the tracks in the sand flats around the springs that gush out of the base of the bluffs in the interior of this wildlife area.

A somewhat different public hunting area can be found 40 miles away in the extreme northwest corner of Dubuque County. It is called White Pine Hollow - a name derived from an extensive stand of Native White Pine in the area. It is administered by the state preserves board and is properly known as a "state preserve". Its 712 acres of forest land have been designated as a National Natural Landmark due to its relic stand of white pine, an extensive cold-air slope of Canada Yew and monks hood plus other rare plants found in only a few locations in Iowa.

Camping and picnicking in the area is prohibited as well as removing or introducing any plant life. Public hunting is allowed. And rightly so since a stable population of ruffed grouse and deer exists within the area as well as pheasants around its edge.

Wild turkey were recently introduced and are definitely not to be hunted. If any sightings are made, a prompt report should again be phoned into the Maquoketa Wildlife Biologist. If the turkey population does establish well, White Pine Hollow may soon be added to a list of areas opened for wild gobbler hunting in the spring. Access is limited to one road on the south and one on the east side. They allow vehicles to the edge of the area only.

Hence, you have now hunted the prominent public wildlife lands of the Maquoketa Wildlife Unit. Consider the variety of hunting conditions found in the Unit. Then realize that with some added effort and friendly discussions with private landowners you can multiply your hunting opportunity ten fold. The Maquoketa Wildlife Unit has a unique blend of upland prairie marsh land, riverbottom bayous, and upland forest. The variety of wildlife reflects this cover diversity. The territory is well worth the wildlife management efforts being put forth into it and is likewise well worth a hunters efforts if you enjoy variety in your hunting. □

Farm Ponds: problems and solutions

By Bruce C. Adair

OVER 60,000 FARM PONDS ranging from one-half to several acres in size dot the Iowa landscape, particularly in our southern counties. Many provide excellent fishing—many do not. Farm ponds require proper management to maintain healthy fish populations.

The following is a summary of comments and questions commonly heard by fisheries biologists from Iowa pond owners.

Are any of these situations characteristic of your pond?

My pond is full of small bluegill. That's all we can catch. We used to take a lot of nice bass out of the pond, but we never see them anymore.

Don't blame those bluegill for your problem. You and your friends who caught all those bass in past years were the initial cause of your present problems. The numbers of bass in your pond have been reduced to the point where they can no longer control the bluegill reproduction.

Your best solution is to either kill out the pond and restock or remove as many bluegill as you can by fishing, seining, and/or shoreline chemical treatment.

We never catch anything but small crappie from our pond. We had some really good crappie fishing several years ago but now they're all tiny. Also we seldom catch any bass anymore.

Unless your pond is an extremely large one, those crappie don't belong in it. The crappie spawn earlier in the spring than the bass, causing large numbers of young crappie to compete with the bass for food. The eventual result will be large numbers of stunted crappie and a weak bass population.

Kill out the pond and stock with recommended species.

We had some excellent fishing for a couple years after our pond was initially stocked with largemouth bass. Now the bass are all small. You can't cast into the pond without catching a bass but they're all too small to keep.

Those bass are crowded and hungry. Bass, like bluegill or crappie, can overpopulate and become stunted if conditions are not right.

In this case you need to add bluegills to your pond. Catch as many bluegills as you can from your neighbor's pond and release them into yours. It wouldn't hurt to continue to remove large numbers of those bass from your pond. This method may take a couple years for those bluegill to get a foothold, but once they do you'll notice those bass start to grow again.

My pond is spring-fed and has a lot of cool water down deep. Why wouldn't trout do well in my pond?

Forget it. Unless you have a very unique situation, don't waste your money on trout for a farm pond. Although the lower levels of many farm ponds contain cool water throughout the summer, this water is not high enough in dissolved oxygen to support fish life. The trout would then be forced to try and live in the warmer water in the upper levels of the pond. When the temperature of this water exceeds 70°F you will have problems keeping trout alive.

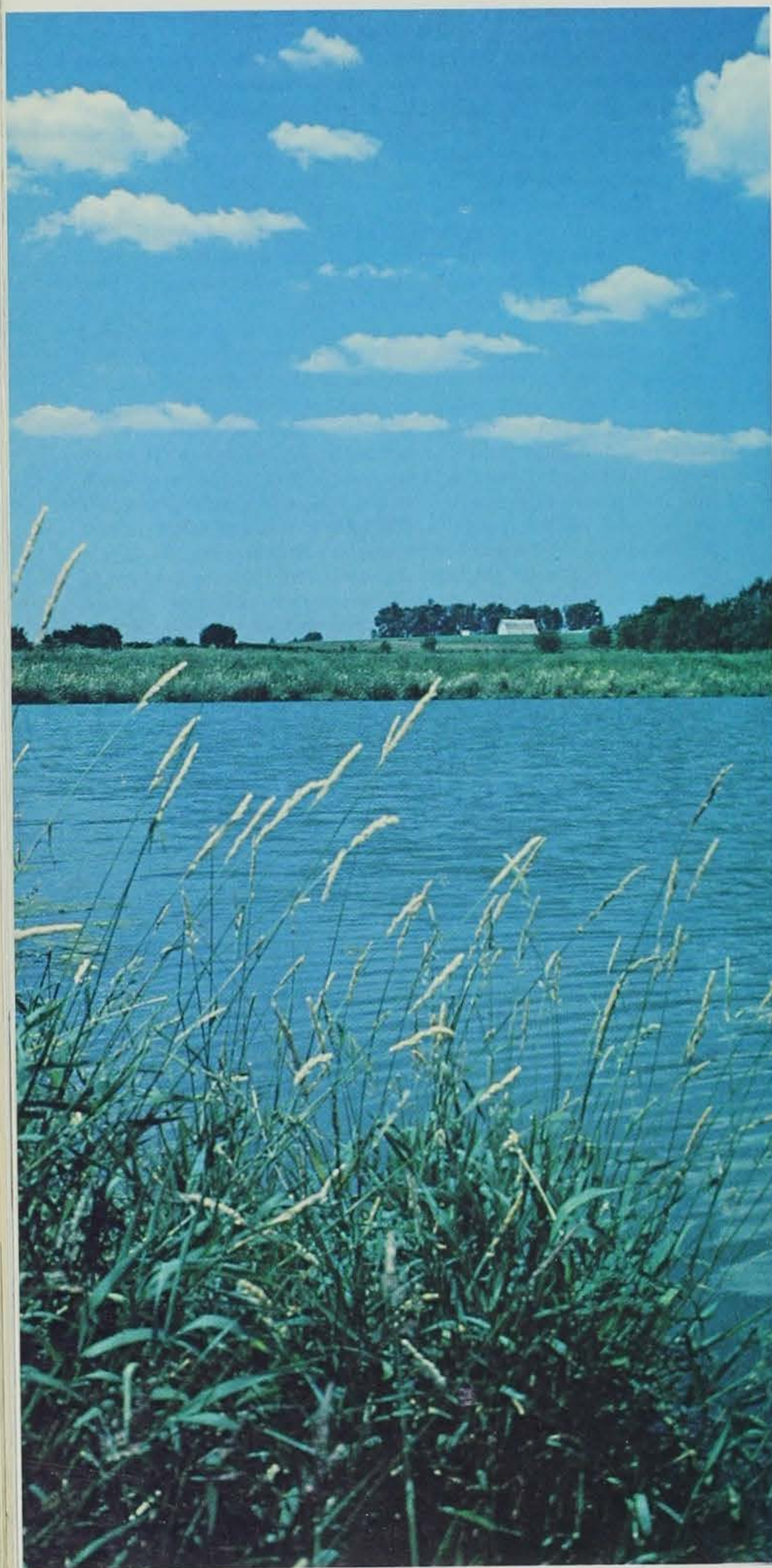


Photo by Ken Formanek

My pond is full of stunted bluegill. If I stocked a few northern pike wouldn't they keep the bluegill thinned out?

Although larger predators such as northerns or flathead catfish might conceivably help thin out a stunted panfish population if stocked in large enough numbers, a healthy largemouth bass population is a much better solution and will continue to sustain itself through natural reproduction.

Why does the Conservation Commission insist on stocking those . . . bluegill?

Why does the Iowa Conservation Commission insist on stocking those damned bluegill? They always overpopulate. I'd rather catch bass.

Bluegill are needed in Iowa farm ponds to provide food for the largemouth bass. If the pond owner will maintain a healthy population of bass in his pond, the chances of maintaining good sizes on the bluegill are also good. Bluegill should provide most of the fishing in a farm pond. They are an extremely sporty fish when taken on light tackle and are excellent eating. Treat the largemouth bass as a trophy fish, not a food fish.

You can't expect to maintain a decent fishing pond without bluegill to provide forage for the bass.

I'd like to have my new pond stocked by the Conservation Commission but if I do I'll have to let everybody fish it. I don't want that.

This is not true. Allow fishing in your pond by permission only. You can and should restrict fishing in your pond only to persons you want on your land. Encourage fishing for bluegill in your pond severely restrict the taking of bass. Remember that one or two good bass fishermen can easily throw a promising bass-bluegill pond out of balance in a hurry by removing too many bass.

I'd like to kill out my pond and restock it. What chemical should I use? Where can I get it? How much will it cost?

If possible drain your pond and restock. This is by far the most economical method. If this is not possible, contact the fisheries biologist in your area for assistance. He will recommend the amounts of toxicant to use in your particular pond and can give you the address of a supplier. For a rough approximation of cost, figure approximately \$10 per foot of water depth in a one acre pond. For instance a one-acre pond with an average depth of 5 feet would require approximately \$50 worth of chemical.

The toxicant most widely used for this purpose is rotenone.

Catfish were stocked in our pond several years ago but we never catch them.

Either the catfish are no longer present in your pond or your fishing techniques are wrong. Catfish will do well in a pond or lake situation, however keep in mind they are probably not reproducing. Once your initial stock of catfish is depleted, your catfishing is over unless you provide additional stockings.

If you do purchase additional catfish for your pond, acquire at least 8-inch fish. They're more expensive of course, but you can expect good survival with these larger fish. Small catfish stocked in an established bass-bluegill pond will only feed the fish already present.

Where can I get some northerns and walleye for my pond?

Northerns and walleye can be purchased from private fish hatcheries, but don't waste your money. These fish don't belong in a farm pond situation. They're expensive to buy and not really worth it. Stick with a bass-bluegill-channel catfish pond for your best results.

What about Redear Sunfish?

Redear will do well in a farm pond in conjunction with your bass and bluegill. They grow to a fancy size and will not overpopulate. They are also much more difficult to catch. If you know a consistent method of catching these fish, let me know!

My pond contains nothing but bullheads. We used to catch some real nice ones but they're all tiny now.

Once again we've got an overpopulated, stunted condition. With no predators in the pond, the bullheads have simply overproduced for the available food supply. Largemouth bass are a good predator of bullheads. You might try stocking some adult bass. Your best bet is probably to kill out the pond and restock.

I like to catch bullheads. Would it hurt if I dumped some bullheads in my bass-bluegill pond?

Probably not, as long as you have a strong bass population in your pond. They should keep the bullhead reproduction in check. You'd better stock relatively large bullheads or you may never see them again.

Do my friends need fishing licenses if they fish my pond?

Yes, if they are residents of Iowa, 16 years of age or older or non-residents, 14 years or older.

My pond gets terribly weedy in the summer. What can I do?

There are a number of aquatic herbicides available which will do the job. Contact your area fisheries biologist for recommendations and the name of a chemical supplier.

It is important to keep your pond relatively weed free not only to make fishing and boating easier but for the proper management of your fish populations. Excessive vegetation provides too much cover for small bluegill, causing overpopulations of these species and an eventual problem of a stunted population. The predators in your pond (largemouth bass) must be able to get at their food (bluegill) to achieve good growth and to keep the bluegill numbers cropped off.

What about those new weed-eating fish, can I get some of those for my farm pond?

Although our work done with the white amur (grass carp) so far in Iowa waters has been encouraging, we are not yet to the point of recommending these fish for general use in private farm ponds. Your best control of vegetation in your farm pond is still by chemical means.

I've got muskrats in my pond. How can I get rid of them?

Muskrats can cause serious problems in a farm pond with their burrowing actions. Harvest these critters in the fall and winter by trapping and sell the pelts for a nice profit. If you're not a trapper yourself, there is probably a youngster not far away who is searching for just such an area to trap. Provide him with a bounty

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for each rat removed from your pond. You'll both come out ahead.

I've seen some big snapping turtles in my pond. I'm afraid they'll eat all my fish. How can I get rid of them?

Don't worry about those turtles wiping out your fish population. Live fish actually make up only a small percentage of their diet. Turtles can become a nuisance however when they steal the fish off your stringer. I'd recommend you trap them and eat them. After you've eaten one you'll probably wish you had more in your pond. They are delicious.

I think most of the fish in my pond froze out last winter. What should I do?

A winterkill is very seldom a complete kill. Depending on what is remaining in your pond, you may want to finish off the job with a fish toxicant and then restock with fingerling fish.

If winterkill is a reoccurring problem, you better take a closer look at your pond to determine if it is really worthy of supporting a sport fishery. A farm pond with adequate depth and a decent watershed should not winterkill except during the most severe of winters.

The fish in my pond are grubby. Can anything be done to get rid of the grubs? Are the fish safe to eat?

Black and/or yellow grubs are quite common parasites of farm pond fish, particularly bluegill. Don't worry about them. There is virtually nothing you can do to get rid of them anyway. These grubs have a rather complex life cycle, a portion of which is spent within the flesh of fishes. The fish are cooked before you eat them so they present no problem to humans.

Some people become squeamish about eating fish containing grubs. One of the best methods is to simply not tell your wife what they are. She'll never know the difference anyway. □

CLAMMING THE MISSISSIPPI

(Continued from Page 14)

To reproduce the male clam discharges sperm into the water through a siphon and the female clam produces eggs that cluster around its gills. Water containing sperm enters the female through a siphon and passes over the eggs fertilizing them. The fertilized eggs develop in a short period and then are released into the water as minute larvae called glochidia. These usually attach themselves to the gills of certain fish where they live and mature for several weeks as parasites. Glochidia can often be observed on the gills of sturgeon and freshwater drum in mid-summer. After the glochidia develop they release themselves from the host and fall to the bottom as tiny clams to live and grow to maturity.

The ebony shell has almost disappeared from the upper Mississippi River. Its decline is reportedly attributed to the construction of the lock and dam system, closure of the river and change in habitat which essentially eliminated the skipjack herring. This herring is a host specific fish for incubation of the parasitic glochidia of the ebony shell clam. As this fish declined in abundance so did this species of clam. Few of either kind remain.

There are over forty different kinds of clams to be found in Iowa. Only several of the thicker shelled and white colored mother-of-pearl are of commercial value. These include clams such as the washboard, three-ridge and maple leaf and muckets. The ebony shell was once of commercial value but no more. Other very tiny clams such as the fingernail clams are very important to the management of waterfowl. One of the principal reasons huge rafts of bluebills and canvasbacks congregate during their migration on pools 16, 17, 18 and 19 is because of the abundance of fingernail clams which are utilized for food.

Clamming methods have changed somewhat since olden days. Some employ scuba gear, others polywog, others (if legal) may use clam dredges — but the most popular method continues to be

the crowfoot bar. It consists of a fir brail 2' x 6' or heavier and twenty feet long which has many gangs of rock hooks spaced three inches apart. Clusters of eight hooks are suspended from short chains affixed to the brail. Two crowfoot bars are fished simultaneously with the third bar boated to remove clams already caught. They are fished by slowly drifting the bars over a clam bed. A large john boat is propelled by the current with the aid of a large canvas "mule" which is suspended in the water. Clams lie in the bottom substrate facing upstream with their shells partly open. When a hook touches the soft tissues, the clam closes its shell and becomes impaled on the hook. A small gas engine lifts the crowfoot bar laden with sometimes over 200 pounds of shells onto standards. Then the clambers hand pick every clam from hooks, sort them by size and kind, and return the small or undesirable shells back into the river. One long day of real hard work when clams are "biting" may yield a clammer three tons or more of shells.

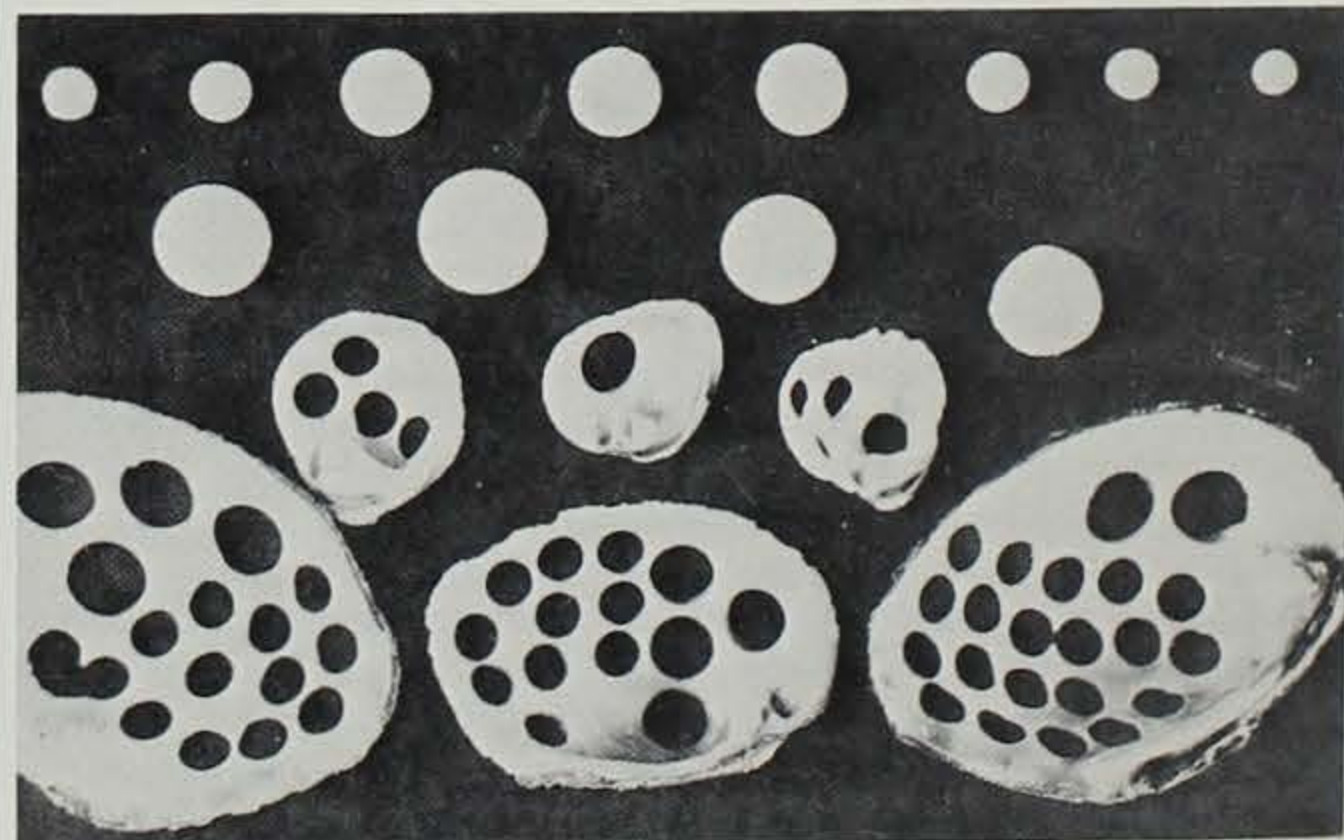
Management of freshwater mussels comes under the review of fish management. Commercial clambers and other interested people often raise questions and issues concerning this fishery. Items often brought out are the need for size limits, catch limits, and measures to protect decreasing or rare-and-endangered species. Extremely little is now known. Even though we license clambers, we do not know the annual harvest by commercial operators. One project underway will provide some parameters for management of the freshwater mussels of the Mississippi River.

A system of requiring commercial fishermen to report commercial fish caught has been implemented for commercial clambers to collect data on clam harvest.

The species composition and relative abundance of fresh water mussels present in the upper Mississippi River, Pools 9 through 13, were sampled with a 10-foot clam bar built specifically for biological sampling. Specimens were collected from known clam beds. Identification was accomplished by specialists at Ohio State University. Along with field sampling, the clam bed locations are being mapped and recorded in navigation charts for Pools 9 through 13.

Data resulting from this and future studies will be utilized to up-date Iowa laws governing clamming in the upper Mississippi River; provide information to prevent dredging and spoiling of clam beds; and to furnish data on which management decisions can be made to preserve, enhance, and harvest this resource for the future.

Although clams might not seem too important to many, they are very important to the minds of a few. Scientists now working on the pollution of our rivers often look to clams as indicator organisms. Their absence is often an indication of extremely polluted conditions. The lowly clam is a living test tube that has been gathering data for many years as they are long lived. The study of their tissues for accumulations of heavy metals and chemical residues is an area which needs probing by analytic minds. Who knows but perhaps an old monkey face might reveal some secrets that will help clean our polluted rivers!



Button blanks punched from shells.

IOWA CONSERVATIONIST/SEPTEMBER, 1976

CLASSROOM CORNER

by Robert Rye

Administrator, Conservation Education Center

Wildlife Management

THE CONSERVATION COMMISSION is concerned with the management of game, fish, and recreation areas. This concern is also very dear to many of us individually. In the Commission, wildlife biologists have the primary responsibility for the game animals in Iowa.

The wildlife biologist is assigned an area consisting of several counties where he attempts to preserve existing habitat and help develop new habitat for the animals. While no two kinds of wildlife require exactly the same things (habitat), all need food, water, and shelter throughout all seasons of the year. Even though the specific habitat needs of each species vary, many different kinds of animals may occupy the same general area. The habitat will then provide us with the wildlife.

To develop new habitat the biologist must first know what kinds of plants an animal needs for survival. His starting point here is to find a place where the proposed animals presently are established. He can do this by relying on sightings by the public, roadkills, or by running a population index.

The Conservation Education Center has a number of programs which are utilized to explain the role of the wildlife biologist and the work he does. One index method studied at the Center and used by biologists is tracking. He will decide on a route, a counting device, record input, and finally evaluate his information.

The observation route is set up using a predetermined distance (say 30 miles). As many types of environments as physically possible are included. We at the Center use close accessibility by the class as our prime consideration. In the classroom situation all possibilities need not be covered.

Once the route is established specific locations along this route are chosen. The area is cleared if need be, covered with sand so tracks will show and a scent cup (to attract the animals) is placed in the center of the sanded area. This will provide a measuring



Scent cup and coyote tracks.

device. Daily or 2 times a day checking for tracks and their identification will provide the index information.

Once we know what animals are in an area, we can compare this area with an area which doesn't contain the same type of animals. All types of organisms (plants and animals) present are counted and identified. The comparison may give clues to the reason why particular animals are in one area and not another.

Other index methods used are nest, bird, and crowing counts, and deer surveys.

Once the requirements for a particular animal have been determined, the job to establish that habitat begins. Many things must be considered in the building of the proposed environment.

The basic requirement for a good food crop is fertile soil. Wildlife will respond in proportion to the fertility of the soil. For this reason the wildlife biologist and the Conservation Education Center study soils and use soil maps in their work.

The Education Center is in the process of developing an outdoor classroom. This area includes many examples of the wildlife biologist's practices, including the edge effect, food plots, and nurse crops.

Edge effect (field borders) can include shrubs next to meadow, corn next to the forest, and meadow between crops and streams. These provide nesting and escape areas for the animals. It also increases insect eating birds, game animals, song birds, and pollinating insects.

Other wildlife management examples that can be observed are the nurse crop, which provides cover and food for wildlife, leaving the outer two rows of crops for winter feed, and leaving fence rows made of shrubs.

The wildlife biologist and the staff at the Center stress that our objective is to work for the benefit of wildlife. To obtain it, we must make value judgements and properly utilize resources available to us.

WARDEN'S DIARY

(Continued from Page 9)

would be out of sight when they came out. Another long wait started. A report on the radio said they had pulled the seine into the bank, taken some fish out of it, and were drinking beer by the fire. In a little while they were out seining some more. Then up by the fire again. This went on all night. There was a little glow of light in the east when, finally, the report came that they had packed up and were headed out. My partner and I took our positions, each behind a tree that would be close to the driver's door of each vehicle. When they stopped at the gate we both stepped out and told them who we were and that they were all under arrest. We got some identification from each person.

The two officers who had been on the river bank all night came huffing and puffing up the trail. They had a young man with them. When asked where they got him, they said, "It's a long story, but he wants some of the action, so he can go to town with the rest of them."

It seems that this young fellow had gone past on the road and saw our car by the gate. He knew his friends were seining the river, so he walked in from another road to warn them. The men who had been seining had just left the river and the officers had come across in their boat, when this young man came running up to them in the darkness and told them the game wardens were coming. So, they had brought him along.

We loaded the seine and two tubs full of nice sized fish into our car. The violators followed us into town. The judge wasn't too happy about holding court before breakfast, but he did. We could have filed a charge on each fish, on each person, but that would be a little hard on them, with a minimum of ten dollars and maximum of one hundred dollars on each fish. Three charges were filed on each man, and the judge fined them fifty dollars on each charge. The fish were taken to the County Home and we got a receipt for them. Then some hot breakfast and home. We had the case all wrapped up.

You know, it was twenty-six hours ago that I started out on what I thought was going to be just a routine day. Come to think about it, what is "just a routine day" in this business?

Jack-In-The-Pulpit



Photo by Ken Formanek