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Wisconsin

NATURAL RESOURCES

September-October 1984 • Volume 8, Number 5

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HUNTER'S ALMANAC
WISCONSIN GEESE
TRAPPING
POLLYWOGS
BUSINESS & DNR

Tamarack (Larix Laricina)

BRIAN KAMNETZ, Editorial Intern

Give me of your roots, O Tamarack
Of your fibrous roots, O Larch tree.
My canoe to bind together...
So to bind the ends together.
That the water may not enter...
from Hiawatha
by Henry Wadsworth Longfellow

Tamarack has the widest range of any American coniferous tree — from Maine to Minnesota and Indiana to the Arctic Circle. It is the only native conifer that loses its needles in autumn. Before they fall, the lacy burnished gold of the needles paint a stirring contrast to the black spruce that commonly grow nearby.

Federal surveyors, laying out the fourth meridian through Wisconsin in the 1830s reported several swamps with tamarack more than three feet in diameter. A good current stand averages only 15 to 20 inches.

Tamarack grow mostly in peat bogs, but do best on rich, moist, well-drained loamy soils along lakes, streams and swamps. They are the first trees to invade as a declining pond turns to bog. Tamarack needs light and will not do well in shade.

The trees grow at a uniform rate throughout a stand which results in straight trunks with very little taper and small branches. These qualities, plus fire and rot resistance make excellent pole stock. Indians once used tamarack for lodge and teepee poles and still do for ceremonial structures.

Tamarack was popular with early settlers for spars and masts on ships and for building. The lean-to addition to the Surgeon's Quarters at Fort Winnebago near Portage is constructed with tamarack rafters. The trees made good fence posts, telegraph poles and push poles for watercraft. On the Mississippi, tamarack driven into the bottom let floating boat-houses along shore rise and fall, unaffected by fluctuating water levels.

Tamarack flowers come early, maturing about the time leaf development begins. Both sexes occur separately on the same tree. Seeds are small, about 318,000 to the pound.

The tamarack root system is ideal for its habitat, rarely more than one and a half feet deep, but often spreading horizontally wider than the height of the tree. Long, tough and stringy, the roots were used by Native Americans to sew strips of birch bark on canoes.

Most stands in Wisconsin are eventually attacked by the European larch sawfly or the larch casebearer. The trees usually die after several years of defoliation leaving numerous gray snags 20 or 30 feet high in the bogs.

Photo by Chris Mattison

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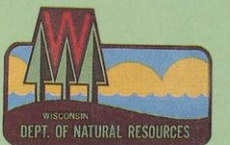
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Special Insert

The Wisconsin Conservation Congress Gets the Gold

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The Quiet Place — Canada Geese by Artist Maynard Reece courtesy of the Leigh Yawkey Woodson Art Museum, Wausau. The museum's internationally acclaimed "Birds in Art" exhibition begins Saturday, September 8th and runs through the 28th. Selected as this year's Master Artist, was Charles Greenough Chase of Brunswick, Maine, the first sculptor ever to receive the honor. Work by 114 artists from around the world will be featured at the exhibition.

Mapping Wisconsin's wetlands

CAROL A. JOHNSTON, former Project Leader
Wisconsin Wetlands Inventory

Photointerpreter Jude Leimer uses a stereoscope to read aerial photos and classify wetlands.

Photo by Ursula Petersen

Laws on the books to protect wetlands need maps to make them work. This means locating and classifying every wetland statewide, a painstaking task, but worth the effort.

A chorus of spring peepers serenades the night. A ballet of sandhill cranes stealthily wades the marsh, stopping now and then to probe for insects and frogs. A sleek brown mink slips between muskrat lodges on winter ice. A delicate white lady's-slipper orchid blooms. These wetland images were once so common it was hard to imagine they would ever be lost.

Although we'll never know for sure how much wetland there was in pre-settlement Wisconsin, estimates range between five and 9.8-million acres — over a quarter of the state. That's more land than all the cornfields in Wisconsin today! We now know that natural wetlands provide many benefits such as fish and wildlife habitat, unique plant communities, flood storage, water purification, recreation, open space, and shoreline protec-

The hardest task of the Wisconsin Wetlands Inventory was to define the limits of that gradation between land and water, and to apply the definition uniformly across the state.

tion. But most early landowners (and some present-day ones) treated wetlands as wastelands. They drained or filled them. By 1974, some 3.2-million acres had been drained.

In recent years there has been growing public awareness of wetland benefits and during the 1970s state legislators debated a number of bills designed to protect what remained. Although they could not agree on how to regulate wetlands, they did agree that accurate maps were needed. Consequently, in 1978 lawmakers created the Wisconsin Wetlands Inventory. Since then, DNR and the Southeastern Wisconsin Regional Planning Commission have been diligently at work trying to finish the 1,720 maps that document and describe the wetlands we have left.

Experts from federal, state and regional agencies helped DNR set up the Wisconsin Wetlands Inventory. One of the first tasks was to define "wetland."

What is a wetland?

Many words describe different wetlands: swamp, marsh, bog, slough, fen, shrub carr, wet

meadow, floodplain forest, low prairie and alder thicket — to recite a few. All these different types occur on land which contains too much water to be called upland, but not enough to be a lake or stream. The hardest task of the Wisconsin Wetlands Inventory was to define the limits of that gradation between land and water, and to apply the definition uniformly across the state.

Almost anyone would agree that a cattail-covered marsh is a wetland, but placing a boundary between a wet meadow and a dry one is more difficult, because most of the year there isn't any standing water in either. Wetland mappers use vegetation and soil characteristics to help. Only certain plant communities can tolerate the waterlogged conditions in wetlands. Likewise, the grey, sticky clay texture (gleying) and shallow mottling of seasonally-saturated wetland soils can be detected even during droughty times when the groundwater has dropped below the wetland surface. The operational definition used by the Wisconsin Wetlands Inventory combined all these wetland attributes.

A bird's eye view

Did you ever wonder how a duck can tell where a bulrush marsh is from way up in the sky? Just as there are plant and soil indicators when you look at a wetland on the ground, there are also indicators which can be seen from the sky. Wetlands are usually located in flat, low-lying areas. Water is sometimes visible between the plants, especially if sun is reflecting off the water. Even though it is impossible to identify individual plants over long distances, the plant communities which grow in wetlands are usually distinctive from the air.

When you watch TV on a black and white set, you can tell which features are dark and which ones are light by the gray tones on the screen. In much the same way, the gray tones on aerial photos indicate how ground features reflect sunlight. "Infrared" light is a part of reflected sunlight which cannot be seen with the naked eye, but can be detected by special photographic films. Different plant communities reflect varying amounts of infrared light. This enables wetland mappers to differentiate between plants by the tones they leave on special "infrared" aerial photos.

Wetland mappers look at air photos in pairs using "stereoscopes." Stereoscopes produce the same 3-D effect as a viewmaster toy or an antique stereopticon. This way, wetland mappers can find the low-lying areas where wetlands occur and distinguish the height of wetland plants.

Of course, even ducks fly down for a closer look before they land. Air photo interpreters do likewise. They field check a portion of the wetlands in nearly every township in the state to make sure the maps are correct. By combining the photographic and field evidence with information from soil surveys, topographic maps, existing wetland maps and other sources, the inventory staff can prepare detailed, accurate wetland maps.

Many users of these maps need to know something more about wetlands than just where they

are. Therefore, codes were developed to classify plant, water and human influence characteristics of the mapped wetlands. Although at first glance the codes might look like mumbo-jumbo, they provide a lot of information without taking up much space. The classification system is a modified version of one developed by the US Fish and Wildlife Service for the National Wetlands Inventory, which will use the DNR-prepared wetland maps as part of its nationwide survey.

Shoreland wetlands

Although the 1978 law directed DNR to map all wetlands, a 1980 revision to Wisconsin's Shoreland Management Program focused special attention on wetlands within the shoreland zone of unincorporated areas. The shoreland zone is defined as land within 1,000 feet of the ordinary



Aerial photo of Hook Lake in Dane County with a few typical classification codes. Here's how they translate:

- E1H** — persistent, emergent/wet meadow, standing water
- E1K** — persistent, emergent/wet meadow, wet soil
- E2H** — emergent/wet meadow, narrow-leaved persistent, standing water
- E6H** — emergent/wet meadow, broad-leaved nonpersistent, standing water, palustrine
- E6L** — emergent/wet meadow, broad-leaved nonpersistent, standing water, lake
- S6H** — scrub/shrub, broad-leaved evergreen, standing water
- S6K** — scrub/shrub, broad-leaved evergreen, wet soil
- T2K** — forested, needle-leaved deciduous, wet soil
- T3K** — forested, broad-leaved deciduous, wet soil
- U** — upland
- WOH** — open water, subclass unknown, standing water, palustrine
- WOL** — open water, subclass unknown, standing water, lake

**Where to get
the Wisconsin
Wetlands
Inventory maps.**

Call or write:

University of
Wisconsin-Extension
Geologic and Natural
History Survey
Map and Publication
Sales

1815 University Ave.
Madison, WI 53706

Phone (608) 263-7389

Copies are also available
for inspection in each
county zoning office and
in DNR district and
area offices.

high water mark of navigable lakes, ponds, or flowages, or within 300 feet of the ordinary high water mark of navigable rivers or streams (or to the landward extent of the floodplain, whichever distance is greater). Shoreland zoning ordinances are administered by counties, and have been in effect statewide since the mid-1960s. The 1980 change requires counties to prohibit most new drainage, dredging, or filling of shoreland wetlands. All wetlands of five acres or more which fall within the shoreland zone and are shown on the final Wisconsin Wetlands Inventory maps are subject to these zoning provisions.

Before Wisconsin Wetlands Inventory maps are adopted as part of a shoreland zoning ordinance, each county holds a public hearing to review the accuracy of the maps. Through this process, hundreds of people have already suggested changes. Most comments question whether an area should be mapped as a wetland at all, rather than criticize the exact location of the wetland boundary or how the vegetation is classified. Many of these are borderline cases which are wet enough to meet the statutory wetland definition, but which some people would not consider to be wetlands because they don't have standing water all year. DNR field checks questionable areas, sometimes with the local zoning administrator.

Some of the errors on the wetland maps are due to changes which have occurred since the aerial photos were taken in 1978-1980. For example, a wetland which may have been mapped correctly as of 1979 may have been drained in 1981. The only way for wetland mappers to find out about such changes is for people to report them during the map review process.

After each submitted comment has been individually reviewed, necessary changes are made and final maps sent back to the county. The

county holds a second public hearing to review these amendments and subsequently adopts the shoreland zoning regulations along with the final wetland maps.

Although DNR has finished preliminary wetland maps for the entire state, most counties are still in various stages of the map review and ordinance adoption process. As of June 1984, final maps had been prepared for 40 counties, and 19 of those had amended their shoreland zoning ordinances to include the new wetland regulations. To find out the status of your county, contact your county zoning office.

The 1980 change requires counties to prohibit most new drainage, dredging, or filling of shoreland wetlands.

Because county shoreland zoning ordinances do not apply to incorporated areas, in 1982 the state legislature required cities and villages to also protect shoreland wetlands. The first cities and villages began receiving Wisconsin Wetlands Inventory maps in July 1984 and will be going through much the same process of map and ordinance adoption as the counties.

The maps

Each Wisconsin Wetlands Inventory map is on a scale of 1:24,000 (one inch represents 2,000 feet), and covers a surveyed township (36 square miles) or more. The wetlands and classification codes are drawn on photographic enlargements so map users can see field lines, woodlots, roads and other features which they can use to help find property boundaries. Most of the photographic enlargements used for map backgrounds are older than the aerial photos used to actually delineate and classify the wetlands. This has confused map users in areas where land uses have changed, but it has no effect on map accuracy. The wetlands are drawn as they occurred in 1978-1980, and would be drawn the same if the map background were a blank piece of paper. Each wetland on a final Wisconsin Wetlands Inventory map is electronically traced, and the information is fed into a computer. The computer can then draw an exact duplicate or a modified version of the map.

In addition, the computer measures the area of each type of wetland on every map and summarizes that information for the entire county, so we will know how many acres of this precious resource remain. If the wetland is drained or rezoned, the computer can automatically draw a new map to show the change. This makes it easier and less expensive to update the inventory.

Of course, a map in itself does nothing to protect wetlands, but it is a powerful tool that gives us the knowledge needed to become better wetland stewards. Hats off to the people who made the Wisconsin Wetlands Inventory a reality!

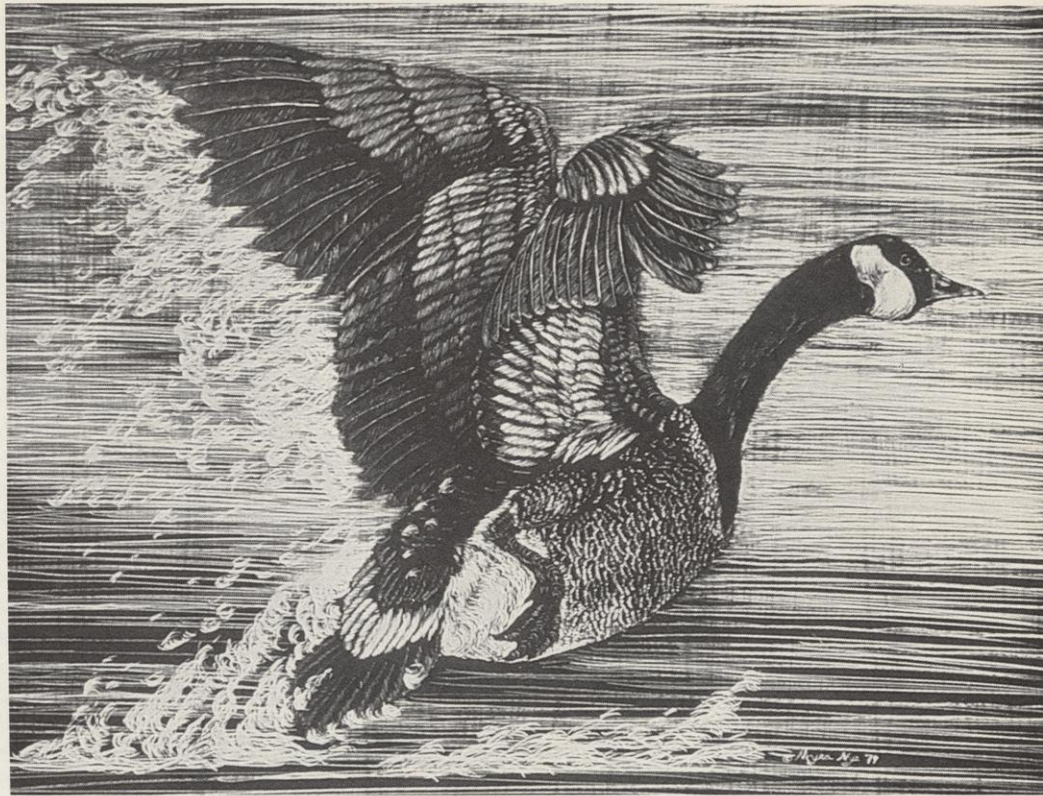
Ecologist Dan Homblette identifies aquatic plants characteristic of certain wetland types. This will help assure accuracy of aerial photo interpretation.
Photo by Carol Johnston



Wisconsin honkers hunker down

JOHN WETZEL,
DNR Wetland Wildlife Specialist

Scratchboard
illustration
by Myra Nye



Canada geese in Wisconsin are a renowned wildlife success. But overcrowding and a possible wipeout by disease — heavy depredations on farmers' crops — and overharvest — have made managers scurry for answers. They think they've found them.

Canada geese were originally abundant in Wisconsin. At the time of settlement they nested extensively on our prairie wetlands and large marshes. These local nesting populations were supplemented by thousands of migrants in spring and fall. Flocks of several hundred spent the winter in southern counties where open water was available. These early flocks actually increased as land was cleared and corn became a common field crop in the latter half of the 1800s.

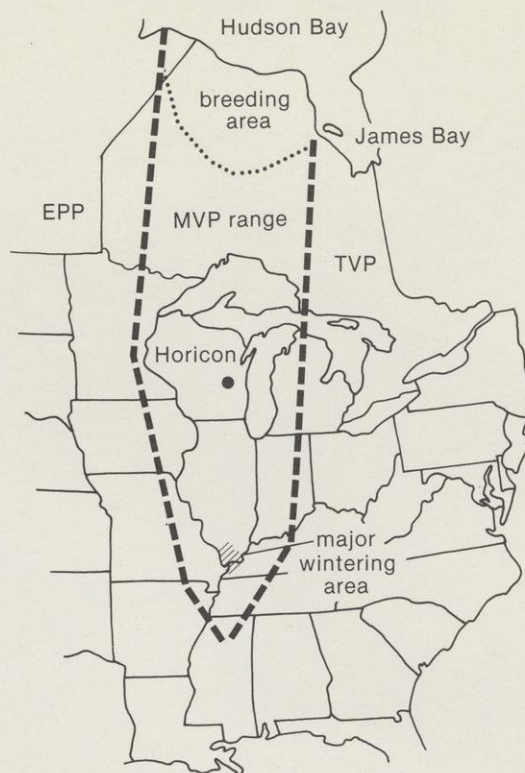
By about 1900, however, resident goose populations had greatly declined because habitat losses, hunting and other disturbances eliminated most breeding and wintering flocks. Spring hunting (often more successful than fall hunting) continued until 1912. After this decline, geese were unimportant in Wisconsin until about 1950.

The birds originally wintered along the Mississippi River and its tributaries from the confluence of the Ohio in southern Illinois down to the Gulf of Mexico. Habitat destruction and intense hunting resulted in eventual establishment of refuges to protect remaining flocks. In 1927 Horseshoe Lake became the first of a series of them established in southern Illinois and western Kentucky. Continued heavy hunting through the early 1940s reduced populations to about 22,000 in Illinois and 50,000 for the entire Mississippi Flyway by 1946. Populations were so low that year the season was closed for the only time on record.

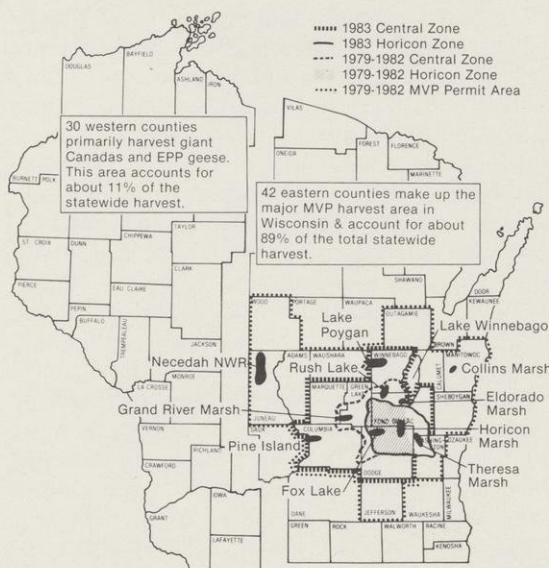
Between 1950 and 1959, the Horicon National Wildlife Refuge (NWR) began attracting more and more geese. In 1950 the peak count exceeded 20,000 for the first time and by 1959 there was a record count of 75,000 birds. With these successes, geese received priority. The planting of crops, especially corn, was emphasized to attract and hold ever-increasing numbers.

The harvest also increased rapidly — from about 10,000 in 1950 to over 50,000 by 1959. In 1953, state-operated goose hunting began inside the Horicon Refuge to provide more equitable hunting opportunity and harvest. By 1958 and '59, large kills in Illinois and Wisconsin had again caused a decline in the Mississippi Valley Population (MVP) — the flock that stops in central Wis-

The major wintering area of the Mississippi Valley Population (MVP) is in southern Illinois. The Tennessee Valley Population (TVP) ranges east of Wisconsin and the Eastern Prairie Population (EPP) flyway is to the west.



Wisconsin Goose Hunting Zones



This was handled by mutual agreement. Wisconsin and Illinois, in cooperation with the US Fish and Wildlife Service (FWS), established a harvest quota system to limit the annual kill.

Migrating geese continued to increase at Horicon during the early 1960s, exceeding 100,000 for the first time in 1962. From 1960 to '62, hunters at Horicon were harvesting 1,000 geese per day during the nine to 11-day seasons. The short seasons and increasing numbers of geese resulted in heavy crop depredation losses in the vicinity of the refuge. There was also a congestion problem with sightseers jamming Highway 49 at the north end of the marsh. In 1962, Wisconsin asked the Mississippi Flyway Council not to increase the winter MVP objective above 200,000 birds until problems around Horicon were resolved. In 1969, however, the Flyway Council increased the winter objective to 300,000.

In 1965, to rectify short hunting seasons and increasing crop depredations, a direct feeding program was tried that used over 500 tons of shelled corn at a cost of \$50,000. This, however, proved unsuccessful. Crops were late because of a wet fall and damage complaints increased. Farmers were successful in getting legislation passed requiring payments for crop losses.

In 1966, the old Wisconsin Conservation Department and the FWS agreed to experimentally haze geese, at Horicon to reduce the total number that stopped at the refuge. But public reaction forced the state to withdraw. Federal personnel, however, carried out hazing for about 10 days prior to hunting. Results were wide dispersal of birds during the day but a return to the marsh at night. When the season opened, geese were highly vulnerable and 30,000 were harvested in only 2½ days. Learning to live with the geese became a preferred alternative to such a large, uncontrolled harvest in so short a time. To control harvests a federal goose hunting permit and tag system was instituted in 1967. This was a significant improvement and worked well through about 1970.

By 1969, management of the Mississippi Valley Population had reached another milestone — 324,000 geese were counted that winter, exceeding the objective of 300,000 for the first time.

In the early 1970s, up to 220,000 Canada geese were concentrated at Horicon and another 25,000 on nearby state properties. The Horicon overpopulation problem had in effect become an east central Wisconsin problem.

By 1976, DNR and the Fish and Wildlife Service were spurred to action by a variety of circumstances: Mississippi Flyway planned to once again increase winter populations; continued short hunting seasons of 16 to 18 days; high depreda-



Only adverse weather
moves geese out of Wis-
consin. When autumn
skies are like this the
birds stay and stay and
sometimes wear out their
welcome.

Photo by Scott Craven



The idea behind hazing geese was to move them out of the state so that no more than 100,000 at a time used the Horicon refuge. This could cut the chances of disease and reduce crop damage.

DNR photo by Dean Tvedt

Upper left:
The big bang of a propane exploder can move geese and help protect crops from depredation but the birds don't fly very far.

Photo by Scott Craven

tion losses to crops; pressure on state legislators and Congress by farmers; concern about possible heavy disease losses with up to 70% of the total flock at Horicon; traffic congestion on nearby roads; and increasingly poor hunting quality and ethics.

Out of these pressures grew a strategy paper that outlined three objectives to be reached by the end of 1980 in east central Wisconsin: 1. Reduce the peak MVP from over 250,000 to 100,000 birds; 2. Reduce goose use days from 11-million to five-million; 3. Manage the flock so that 95% of the fall use occurs before December 5th. The "Horicon Program" began in the fall of 1976 and ran through 1980.

The following goals were to be achieved: A. Perpetuation of the flock in Wisconsin; B. Better spacial distribution of geese in east-central Wisconsin; C. Improved management for species other than Canada geese on Horicon NWR, especially ducks.

The program was based on the "flow-through" concept which theorized that practically all MVP geese stopped at Horicon for varying lengths of time each fall. If disturbance was carefully applied at Horicon and other concentration sites, geese would shorten their stay in Wisconsin, thereby reducing peak counts but not affecting the total number of birds that stopped each year or the potential yearly harvest. It was just a matter of adjusting disturbance levels to achieve and maintain the planned peak of about 100,000 birds from mid-October through mid-November.

Almost immediately research cast doubt on the "flow-through" idea. Results showed that geese did, indeed, return each fall as expected, but their tendency to remain at Horicon and in east central Wisconsin was much stronger than expected. It proved extremely difficult to move large numbers out of the state. Only in late fall when adverse weather provided the incentive did birds move further south. These geese came to be known as the "Wisconsin segment" of the MVP. Research-

ers discovered that most birds which arrived early in southern Illinois and western Kentucky did not stop in Wisconsin. These geese were a separate segment of the MVP.

This research was extremely important to managers. They now know that not all MVP birds stop in central and eastern parts of our state. Only the Wisconsin segment does. Thus the Wisconsin segment has to be large enough to accommodate not only our state's annual harvest but also whatever additional geese are taken as the birds migrate down the flyway in December and January.

Managers tried to put the findings to practical use. The east central Wisconsin peak was raised from 100,000 to 120,000 birds in 1979 with a planned distribution of about 60,000 geese at Horicon and 60,000 on satellite areas.

Between 1976 and 1980 attempts were made at Horicon to reverse or change the three time-tested conditions that attract and hold geese — food, water and undisturbed sanctuary. Some worked, some didn't.

Water drawdowns and upland hunting were both abandoned as control techniques after 1976. Geese had easy access to water around Horicon and quickly adapted to roosting on the exposed mudflats where they were inaccessible to disturbance by airboats. Upland hunting took place too far away from areas used by geese to affect them.

Airboat harassment during morning and evening hours proved to be the most effective goose dispersal technique. These were used, combined with propane exploders and helicopters from 1976 through 1979. Since 1980, there has been no direct disturbance of Canada geese.

This program reduced the total number of geese using the national refuge from over 200,000 in the early 1970s to about 80,000 by 1980. Peak counts in east central Wisconsin dropped from 207,000 in 1976 to 115,000 in 1980. Progress was also made in redistributing geese. Since the early 1970s, numbers have risen on most major state satellite areas with major increases on Grand River and Theresa Marsh Wildlife Areas.

The better distribution and drop in total numbers at Horicon has also reduced the potential for a catastrophic disease epidemic as only 30% of the total MVP now uses Horicon. Less emphasis on crops for geese at Horicon has benefited ducks and other nesting bird species — the original reason the national refuge at Horicon was purchased.

Final analysis of the decrease in peak counts in east central Wisconsin showed that about 20% of the decrease came from migrational changes and 80% from increased harvests in Wisconsin, Illinois and other states.

In 1979, with the "Horicon Bottleneck" broken, the Mississippi Flyway Council adopted a MVP Plan. It called for a 15% increase per year in the flock. This increase would provide for normal harvest levels in northern states while putting increased crowding pressure on wintering geese in southern Illinois and western Kentucky, encouraging birds to spillover into southern states and



once again provide recreational opportunities in those areas.

The population, however, did not respond as planned. It plunged from a 1977 high of 575,000 to only 251,000 in 1981. The question immediately arose — "What happened?"

The first culprit was relatively easy to find. Harvests were exceeding objectives, especially in Wisconsin and Illinois. In some cases they were double or triple what they were supposed to be. Studies were set up to find overharvest locations and measure their magnitude. They revealed that harvests in the four-county Control Zone in southern Illinois versus upstate areas had changed from an 80:20 split (80% being taken in the Control Zone) in the early 1970s to a 65:35 split. In 1982, Illinois readjusted their quota to reflect this change and also limited the daily harvest to one bird per day upstate. All states harvesting MVP geese were also limited to a 40-day season by the Flyway Council.

Wisconsin studies also showed a major shift. Only 40% of the statewide Canada goose harvest was now occurring within the 1982 Horicon/Central Zone boundaries and another 40% in the 16 county MVP Area. This compared to an estimated 80% of the harvest concentrated around Horicon in the early 1960s.

Over half of Wisconsin's MVP Area harvest (22% of the state total) was concentrated in portions of the six counties that remained outside the 1982 Horicon/Central Zone boundaries.

Thus in 1983 the Horicon/Central Zone boundaries were expanded to include Dodge, Fond du Lac, Columbia, Green Lake, Marquette

New goose management goals will provide better hunting opportunities throughout central Wisconsin.

DNR photo by Dean Tvedt



After the turn of the century, most geese seen in Wisconsin were only passing through. Loss of habitat, hunting and other disturbances had virtually eliminated nesting and wintering populations. Photo by Herb Lange



The reproductive rate for geese that pass through Wisconsin (the Mississippi Valley Population) has dropped 20% in the past seven years. DNR photo



One goose can eat about five pounds of corn per day. When 200,000 stopped off in Wisconsin, depredation problems were serious. Photo by Scott Craven

and Winnebago counties as well as the northwest portion of Washington County that includes Theresa Marsh. This provided for tag control over 60% of the statewide harvest but did not make the tag zone so large that it became unmanageable. This expansion was put into effect only after DNR insisted on a reasonable 1983 harvest objective of 25,000 birds for the state of which 15,000 were assigned to the Horicon/Central Zones by the FWS.

The second culprit was neither easily recognized nor fully understood until this past February when 1983 age ratios became available. Yearly age ratios provide one of the best indicators of yearly production for the MVP. A high ratio indicates a large number of goslings have been raised and production has been good while a low ratio indicates poor production. A close look at the age ratios since 1976 reveals eight years of below average production compared to records since 1966. The average 1966-83 age ratio is 1.04 young per adult while the ratio over the past eight years is only 0.82 young per adult, a drop of about 20%. Production could not be rated good to excellent in any of the last eight years — an unprecedented occurrence.

When the twin factors of overharvest and poor production are combined, it is not surprising that the Mississippi Valley Population is down since 1977. It is actually rather remarkable that the Wisconsin segment has maintained itself at about 135-to-140,000 during the last three years.

For the future, it is imperative that harvest controls be improved throughout the MVP range in order to increase the flock and assure a bright future for the Wisconsin segment. To accomplish this the department would like to see the Wisconsin segment increased to about 200,000 birds by the year 1990 with an allowable harvest of 50,000 annually of which 30-to-40,000 would be taken in Wisconsin. These ideas have been endorsed by the Natural Resources Board.

The ideal distribution would have approximately half the birds at Horicon and the rest at other state and federal areas. There is currently room for about 85,000 geese outside of Horicon distributed as follows: Collins (Manitowoc County) — 5,000; Eldorado (Fond du Lac) — 10,000; Grand River (Green Lake/Marquette) — 30,000; Necedah NWR (Juneau) — 10,000; Pine Island (Columbia) — 20,000; and Theresa (Washington/Dodge) — 10,000. Another 15,000 geese would have to be accommodated on new refuges in central Wisconsin.

Canada geese have been common migrants in Wisconsin since about the early 1950s. In the past 30 years they have become not only sought-after hunting trophies but also big pests when populations exceeded human tolerance levels as happened around Horicon in the early 1970s.

Their nesting areas are secure from human interference, but achieving the objectives outlined here will take time. The question is: Will impatience for immediate returns prevent it from happening? I hope not! The future of these birds is too important!

Peak Goose Counts

Year	Horicon Area	Grand River	Pine Island	Eldorado Marsh	Collins Marsh	Theresa Marsh	Central* Wisconsin
1971	216,800	2,800	7,300	4,200	3,100	180	249,900
1972	210,300	5,600	8,200	5,000	1,200	100	225,900
1973	178,000	8,200	7,500	4,500	2,800	50	199,100
1974	203,800	9,800	8,500	6,700	2,400	500	239,500
1975	220,100	13,200	11,300	4,900	4,200	800	242,400
1976	172,200	12,400	9,100	10,000	2,300	800	207,000
1977	130,800	47,000		17,800	3,300	9,600	190,400
1978	62,300	40,000	4,800	6,200	2,200	4,000	124,000
1979	70,900	14,600	4,600	5,900	4,300	3,100	108,400
1980	79,100	15,000	7,000	1,500	7,400	3,000	114,800
1981	90,300	18,900	7,000	2,500	6,000	3,500	136,400
1982	86,400	27,000	9,000	4,300	6,000	3,300	134,000
1983	83,800	38,000	4,650	3,300	5,500	3,300	141,900

*Includes all refuges plus Necedah-Sandhill and Central Wisconsin lakes.

The Mississippi Valley Population (1000's)

Year	Quotas		Federal Estimated Harvest		Immatures per adult in harvest	
	WI	IL	WI	IL		Mid-winter count
1966	14	20	27.9	28.0	1.43	208.9
1967	20	20	21.3	35.4	1.55	215.2
1968	20	20	25.3	21.2	1.23	250.0
1969	25	25	42.8	29.4	0.73	324.4
1970	35	35	28.6	37.7	0.88	292.1
1971	28	28	52.5	34.4	1.27	293.9
1972	28	28	35.8	33.7	0.90	295.8
1973	28	28	60.8	28.5	1.08	277.7
1974	28	28	77.0	47.1	1.47	304.3
1975	28	28	66.4	44.8	1.57	304.9
1976	28	28	45.7	53.7	0.83	478.9
1977	35	35	89.9	76.6	1.01	575.4
1978	50	50	85.7	118.7	0.66	435.5
1979	35	35	62.2	69.0	1.07	395.0
1980	30	33	59.5	57.7	1.09	367.0
1981	20	30	39.8	51.5	0.71	251.0
1982	18	27	46.1	27.2	0.84	303.7
1983	25	27	35.3	46.8	0.40	352.8



Where does the wild goose go? To find out researchers put out bait, shot a trap net and captured some for marking. Goose neck bands could be seen a half mile away and revealed, among other things that hazing wouldn't make them migrate.

DNR photo by Dean Tvedt

Goose research 1974-1984

The primary tool of the research program was a population of marked geese. From 1974 to 1983, over 20,000 geese were captured and banded. At Horicon National Wildlife Refuge alone, more than 8,000 birds were marked with colored plastic neck bands, each bearing a unique number-letter code. A crew of three to five observers followed the geese each fall and winter throughout Wisconsin and their primary winter range in southern Illinois. The neckbands can be identified at distances up to a half mile or more and individual geese have been seen dozens of times. The repeated locations of the marked geese provided the basic data on movements, behavior and areas used by geese while the recovery of banded geese by hunters provided data for studying survival and mortality rates and patterns.

The neckbanded geese revealed that they were very faithful to Horicon and even to specific parts of the area year after year. Although the geese readily flew up to 10 to 20 miles to find food and moved between Horicon Marsh and several lakes such as Big Green and Lake Maria, they moved freely in very predictable patterns. The geese dispersed from Horicon Marsh to nearby areas when exposed to airboats, low water and other forms of disturbance, but only a small proportion seemed to alter their normal migration patterns by moving south into Illinois sooner than they would have in the absence of disturbance. During the years of high harvest quotas (1977, 78, and 79) the geese in Wisconsin sustained high mortality rates, and much of the decline in numbers in Wisconsin could be attributed to those years of large harvests. As harvest quotas and disturbance were reduced, the numbers of geese at and around Horicon began to increase. This increase has been very gradual and is continuing.

SCOTT CRAVEN,
Assistant Professor,
Wildlife Ecology,
UW-Madison

The readers write

Editor's note:

Unfortunately, the magazine's three special issues on forests, parks and fish preempted this section for half a year. Now it's back. There are some old letters here but the reader's right to write and be printed is sacred and here-with re-upheld in a slightly longer version.

J. Wolfred Taylor

I have often visited Thunder River Trout Hatchery in Crivitz and am always pleasantly surprised at the reception from Mr. Gary Holzbauer, hatchery manager.

Many of your readers have no idea what kind of work goes into raising some 200,000 to 300,000 trout.

Mr. Holzbauer provides a complete tour and explains the hows and whys of raising trout in Wisconsin.

The hatchery is extremely well kept, and I was very impressed.

DICK COLLINS,
Racine

In regard to the article, "I Shot My Best Friend" in the Hunter Safety Supplement. Incredible! It's hard to believe anyone could really have buck fever or hallucinate to that extent. I've hunted for 10 years in Wyoming, Canada, Wisconsin and have never seen any game wearing blaze orange. I certainly hope he never uses another rifle, pistol or bow. My sympathy for the man who will never forget what happened on that day.

SCOTT R. MANTEY,
Milwaukee

Thanks for the wonderful ground-water supplement to Wisconsin Natural resources.

This has always been an area of particular interest to me, and I was under the impression of being fairly well versed in the subject. However, upon reading the publication, I realized how little I actually knew and how much there is to learn.

RANDOLPH JAMES STOWE,
Morton Grove, IL

Lately, I've been shocked to read about all-terrain vehicles in farm papers and the news. What I glean is that the State of Wisconsin and DNR has a basic pro-machine, pro-mechanization stance regarding ATVs, snowmobiles, motorboats, four wheel drive vehicles (those good ole road hunters) and the like.

Trails and grooming are more and more "in" — even helicopters and flying kits are now getting popularized. This is wrong, wrong, wrong. There should be no harassment of wildlife, of the outdoor mood and/or of the retreat atmosphere of the quiet countryside.

I'm a conservationist, an environmentalist, and it bothers me that DNR does not seem to be bothered by the things that are bothering me.

We concerned citizens may just have to bypass the modern technocratic version of DNR if we are going to save what little is left of the environment. I'm really getting more and more ticked off as I write this note. I'm thinking of all the lethargy in DNR on aldicarb; the emphasis on PR stuff; the slick DNR magazine; the quickness with which all those farmers were given deep well permits; the overpromotion of tourism; the politicization of the cause; the favoritism shown hunters — seems as though they run the department; the articles in the magazine that promote and encourage hunting ("The mythical minority; women who hunt") as if we need still more hunters anywhere — local ducks are burned out in the first day or two of the season with the sanction of DNR.

I'm a conservationist, an environmentalist, and it bothers me that DNR does not seem to be bothered by the things that are bothering me. Are you sleeping with the foxes and running with the hounds? Do you have convictions, or are you shot through with PR'ism?

DNR, overall, is way too permissive. I don't agree at all with farmer acquaintances that DNR is like a know-it-all big brother. It's more like a promiscuous little sister that just can't say no to anybody.

When and why has DNR strayed so far afield from the philosophy of Aldo Leopold? It's demoralizing.

DAVID TILLOTSON,
Lake Mills

I was particularly taken with the article last winter on bear hunting. It was interesting to learn that you can tell a bear's age by the ring around the root of the tooth. Can you tell me what is done with the pulled tooth after the bear's age is determined?

H.L. LAWSON,
Watertown

The tooth pulled for aging bears is less than one-half inch long. Several cross-sections are taken from the tooth and the rest is discarded.

You have had some very nice articles about Indians in the magazine. Now you should publish the other side of this situation. It is only fair to the rest of the people. P.S. I am part Indian.

BERNARD BELISLE,
Ojibwa

The problem of road-hunting is a serious one and should be addressed by some official body. Again this year, the Oral and Maxillofacial Surgery Section of the Marshfield Clinic will treat patients with gunshot wounds to the face, people shot by road-hunters. These disfiguring and painful injuries are unnecessary and must stop.

Except for the physically handicapped, there is no need for road-hunting. If hunting is to be a part of our future, the public will rightly expect and demand the development of hunter conduct ethics in which road-hunting has no part. Ethical hunters and landowners must band together to develop legislation to prevent the firing of a firearm within 50 feet of any road.

RICHARD A. PETERS, D.D.S.,
Marshfield

We are avid snowmobilers and also devoted readers of Wisconsin Natural Resources magazine. Last winter an article made us aware of the damage we can cause to cane beds. Many snowmobilers are also hunters, fishermen, bird watchers and nature lovers. Most of us try to enjoy our sport and still preserve nature and the habitat of wildlife.

ROSEMARY WAGNER,
Secretary of Whitewater Sno-Seekers

In the Strategic Plan for Wisconsin Forests issue of the magazine I was appalled to find fabrications and shocking plans for the future of our state's beloved woods. The plan wants to eliminate "no cut attitudes" and encourage logging on 90% of private lands. If these forests aren't cut, they supposedly will turn "into a gray maze of rotted trunks."

In reality, undisturbed forest tends to become quite impressive with time — witness the National Parks or the few remaining uncut tracts here in Wisconsin. Of course the weak and crooked trees will naturally perish, allowing the strong and secure ones to flourish. I have yet to see a forest self-destruct because it wasn't logged.

The plan says, "It's a fact that species of less commercial importance take over as an aspen stand declines." In my area, valuable white ash, sugar maple and conifers such as white pine commonly replace aspen. Why does DNR feel it necessary to print such fallacies?

Purveyors of the plan stress that wildlife and recreation are only secondary management considerations. They "recommend intensive timber management and harvest on state and federal wildlife lands," since this would "bring in over a million dollars a year." What an incomparable use of wildlife lands! They proclaim "clearcutting eventually benefits wildlife." I agree that limited clearcutting may benefit some wildlife, but if natural forest disappears, where are animals to go?

What effect will 800,000 acres of new pine plantations have on our environment, since they are generally considered to be biological deserts? Wisconsin's National Forests are supposed to start converting 110 acres to plantation rows each year. Fine for timber production, but let's not overdo it!

Plantations are prone to insect and disease outbreaks. Therefore they require extensive applications of pesticides and herbicides. They also contribute to fire hazard.

The plan worries, with good reason I might add, about the "unknown... reaction of the public" to their "full steam ahead with logging" plans.

According to plan, "Studies have been conducted over the years which verify the benefits of intensive management." Benefits to whom or what? Timber compa-

nies? What about quality of life and the environment?

I myself log and am all for balanced, moderate use of natural resources. However, I do not feel that our forests should be destroyed on such a large scale. Many of us are concerned for the forest and its creatures, for how can it defend itself from human rapaciousness?

MICHAEL HEIM,
Hayward

The Strategic Plan for Wisconsin Forests outlined in the March-April issue indicates that an additional 810,000 acres will be planted to pine. A study by the Colorado Division of Wildlife (1976) places a value of \$709.00 as the cost to replace a deer lost due to habitat destruction.

If we select an arbitrary number of 25 deer per square mile, the conversion of 810,000 acres (1,266 square miles) to pine represents a deer habitat loss worth \$22,439,850.

Wisconsin sport hunters and wildlife watchers should question how DNR Bureau of Forestry determined cost benefit ratio between deer and the private forest industry when recommending such pine planting.

KEN ANDERSON,
Eagle River

On the same day that I read your article on Wisconsin woodpeckers by Ken Wardius, I had a female red-bellied woodpecker eating sunflower seeds in one of my bird feeders. But the picture caption of this species stated they live only in the southern half of Wisconsin. When I mentioned this to a friend, he reported having red-bellies at his feeder in Siren on numerous occasions last winter.

GARY DUNSMOOR,
Spooner

Why was the hunter's choice system originally set up to only check back two years for repetition? Some hunters receive a permit every other year, while others (three out of nine in our party) have been passed by since the program began.

I make my livelihood amidst computers, and find it difficult to believe the cost is prohibitive. Flexibility and ease of modification is the great advantage of computers.

Is it bureaucratic red tape that's so cumbersome? If so, why not return to the old and favored party permit?

It looks like, with all the concern for limiting deer kill, the crows will eat the best from the resultant excess starvation of the herd.

BOB SEM,
West Milwaukee

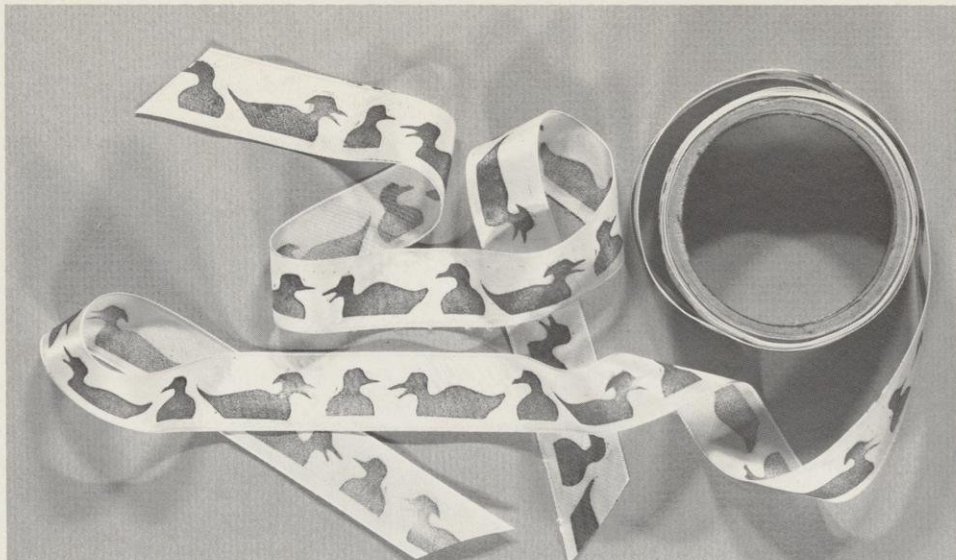
The Wisconsin Legislature created the hunter's choice permit law, and any changes to extend the preference system would require the passage of further legislation. A bill introduced in the last legislative session to extend preference to unsuccessful applicants for a four year period did not pass.

Assuming the necessary legislation is passed, computer technology exists to handle extended preference but at considerably increased cost and time for processing.

About 380,000 hunters apply for permits, and DNR has only about four weeks between the application deadline and the deer season to process this huge volume and mail permits to successful applicants. Present computer use involves selection of random numbers to determine the winners and entry of successful applicants for comparison with the preceding years' list to detect fraud.

An extended preference would require entry of names, addresses and a tracer number for all 380,000 applicants every year. At least a one-month earlier application deadline would be necessary for processing.

Extended preference can be accommodated with authorizing legislation, more time and more money.



"Duck Tape"

The scientific name for the great gray owl is *Strix nebulosa*, not *Scotiaptex nebulosa*.

Not only the great gray, but other owls as well — for example short-eared owls and snowy owls — hunt in the daytime.

The family of great grays seen in Wisconsin were not observed in winter — as implied.

It is hard to know what an owl is thinking. I question that a great gray with a birdwatcher close is really "listening for the minute rustlings of small mammals..." I felt I had the full attention of the only great gray owl I have ever been face to face with. Who knows?

Your magazine is very fine. The article on woman hunters was fascinating. I've hunted over 60 years. As to recent times — I haven't gone hunting since yesterday.

FRAN HAMERSTROM,
Plainfield

Short-eared, hawk and snowy owls are more active in daytime than is the great gray. A number of other owls also become very active during the day at certain times of the year.

DON G. FOLLEN, SR.,
Arpin

Jennifer Haack, the author of "Great Gray Owl" misinterpreted two passages from Robert W. Nero's book, *The Great Gray Owl*. The great gray is not the only owl active during the daytime, but it "...is

***distinct among its kind, being the only species among the eleven in the genus *Strix* that is not primarily nocturnal.*" Snowy owls, (*Nyctea nyctea*), short-eared owls (*Asio flammeus*), and hawk owls (*Surnia ulula*) are in different genera.**

Nero's book also notes that the great gray, today known as *Strix nebulosa*, was formerly known as *Scotiaptex nebulosa* in the scientific community.

It is a great concern to me that our animals can continue to be illegally maimed or killed when so much literature is available explaining the benefits of wildlife to humans.

Two days after I received my Wisconsin Natural Resources issue with the beautiful goshawk cover, an injured goshawk was brought into my office. Modern technology, a caring veterinarian, and the concern of the family who discovered the bird could not mend its wounds, and it had to be destroyed. The next week the same situation occurred with an adult red-tailed hawk. Both were victims of shotgun injuries.

Most bird species are protected by law. If people won't allow these birds their freedom for the sake of beauty alone, maybe they'll think twice when threatened by stiff penalties.

JAMES S. ANDERSON,
Outagamie County Naturalist

◀ Most of the "Cold Hands, Warm Heart" survival list makes sense, if I intend to get lost or marooned somewhere. But I confess that I can't figure out what to do with the "duck tape" listed as part of the necessary survival equipment. After looking a long time, I found some. Maybe I got the wrong stuff; I enclose a sample and would appreciate further instructions. I had one heck of a time finding it and sure would like to use it properly.

RICHARD C. SCHNEIDER,
Stevens Point

P.S. Are you sure that you didn't mean "duct tape" which, in Wisconsin, is typically pronounced as one word?

I have always enjoyed Wisconsin Natural Resources magazine and would like to compliment you on the variety and quality of subjects you cover.

The ever-growing conservation attitude of the American people is reassuring. I sincerely hope this trend continues.

In your last Justin Isherwood story, "Buena Vista Marsh," the author remarked, "We are beginning to realize we own land less than we are owned by it, less hold it than are held by it." This shows great insight and understanding of the balance that really exists between resources and man.

The ever-growing conservation attitude of the American people is reassuring. I sincerely hope this trend continues.

DENNIS J. GABER,
Cameron, TX

Congratulations on the beautiful state parks issue.

However, on page 9 the plants in flower appear to be *Polygala paucifolia*, commonly called milkwort. The leaves in the foreground appear to be those of *Aster macrophyllus*, the large-leaved aster. I could see no violets in the picture.

MARK FAY,
Eau Claire

Three other readers caught the same error.

Wisconsin hunting regulation changes

- Group deer hunting legalized (see story).

Once a licensed hunter obtains the bag limit of any species of game other than deer, the hunter may carry a loaded firearm and assist members of any hunting group **but may not shoot at or kill additional game of that species.**

- Conservation Patron license established for Wisconsin residents (see story).

- Nonresident Furbearer Hunting License created for skunk, raccoon, fox, weasel, opossum, coyote and bobcat; firearm or bow. Bobcat require a DNR permit. There is no nonresident trapping.

- A wild turkey hunting stamp is required of all turkey permit holders except Senior Citizen Recreation Card holders. The \$11.75 stamp can be purchased at a limited number of license outlets and is required for wild turkey hunting in addition to a Small Game, Archer, Sports or Conservation Patron license and permit.

- The rule on muzzle-loading firearms in vehicles is modified. Muzzle-loaders are considered unloaded if the cap is removed from a caplock muzzle-loader or the flashpan is cleaned on a flintlock; ball and powder can remain in the barrel.

- Seasons on pheasant, Hungarian partridge, quail, sharp tails, jackrabbit and southern zone cottontail rabbit open on the same day — October 20, at noon.

- Seasons on pheasant, Hungarian partridge and quail are 10 days longer than in 1983 — October 20 to December 12, 1984.

- Deer management unit 67 has been divided. See map in regulations book.

- Attach deer tags to the ear or antler not to the gambrel.

- Only shotguns and muzzle-loaders are permitted for deer the first two days in all of Buffalo County and the Zone B1 (see map in regs book) portion of Jackson, Trempealeau, La Crosse and Monroe counties. Rifles and handguns may be used thereafter.

- The reduced pheasant bag limit of one daily, two in possession after opening day is extended from the first two days to the first two weeks of the pheasant season.

- Pheasant hunting hours close at 2:00 p.m. daily on 17 state properties. All are posted with Department signs and maps and rules may be obtained from most DNR offices. The properties are: Allenton (Washington Co.) Brooklyn (Dane and Green Cos.)

Collins (Manitowoc Co.)

Dunnville (Dunn Co.)

Goose Lake (Dane Co.)

Holland (Brown Co.)

Horicon (Dodge Co.)

Killsnake (Calumet and Manitowoc Cos.)

Little Scarboro — Kewaunee (Kewaunee Co.)

Mazomanie (Dane Co.)

New Munster (Kenosha Co.)

Theresa (Dodge and Washington Cos.)

Tichigan (Racine Co.)

Vernon (Waukesha Co.)

White River (Green Lake and Marquette Cos.)

Witwen (Sauk Co.)

- Hen pheasants will be legal on 12 state properties:

Avoca (Iowa Co.)

Blackhawk (Iowa Co.)

Collins (Manitowoc Co.)

Holland (Brown Co.)

Little Scarboro and Kewaunee units of the Kewaunee Fish and Wildlife Area (Kewaunee Co.)

Mazomanie (Dane Co.)

New Munster (Kenosha Co.)

Pine River (Richland Co.)

Theresa (Dodge-Washington Co.)

Witwen (Sauk Co.)

Yellowstone (Lafayette Co.)

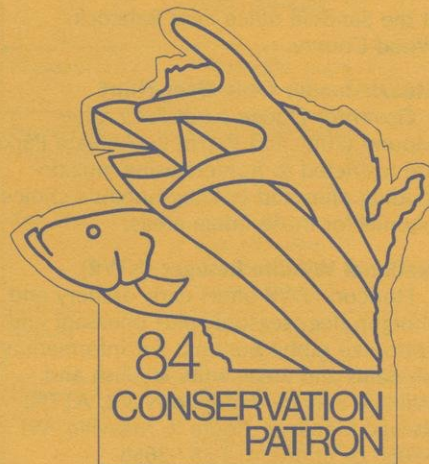
\$100 Conservation Patron license

Starting this fall a new all-purpose Conservation Patron license will go on sale for \$100. It covers all small game, deer, bear and archery hunting, plus fishing, sturgeon spearing and trapping licenses.

The license also eliminates the need to purchase waterfowl, inland trout and Great Lakes salmon and trout stamps.

Actual stamps are not included so Patron License holders who are collectors and want stamps will have to buy them separately.

In addition to the multi-use license, the patron will receive a carrier for special permits such as those required for sturgeon, bobcat, otter and pheasant. Also included with the Patron license are a Wisconsin State Parks and Forests admission sticker, entrance to the historical Heritage Hill State Park, use of State trails, applications for Hunter's Choice and Goose hunting permits, as well as registration stubs for deer gun and deer bow and a year's subscription to the *Wisconsin Natural Resources Magazine*.



The Wisconsin Conservation Patron license will be valid from September 1 through August 31.

Applications can be obtained at County Clerks' offices and DNR field stations or sport shops. Purchase is by mail only. Send to DNR License Section, Box 7924, Madison, WI 53707.

1984 permit deadlines

Applications must be on DNR forms which can be obtained from DNR offices, county clerks or license outlets.

- Hunter's Choice or Antlerless Deer: Postmarked no later than Oct. 5.

- Canada goose hunting — Horicon Zone or Central Zone: Postmarked no later than Sept. 15.

- Canada goose hunting — Mississippi Valley Population (MVP) Zone (counties surrounding Horicon Zone): No deadline. FREE permit available about Sept. 10.

- Canada goose hunting — Theresa Zone: Apply in person at DNR Station, Theresa Wildlife Area between 9:00 a.m. and 4:00 p.m., Oct. 8-12 or between 5:30 a.m. and 3:00 p.m. throughout the goose season beginning Oct. 13.

- Turkey (1985 season): Postmarked no later than Nov. 2.

- Sandhill Wildlife Area deer hunt: Postmarked no later than Oct. 5.

- Bobcat: Postmarked by Oct. 5.

- Otter: Postmarked by Oct. 19.

- Disabled persons (Permit to hunt or shoot from a standing automobile): Apply to your local warden at least 10 days before date of use.

Incentive deer

During the 1984 gun deer hunting season this fall some hunters will be able to take a second deer in six south central Wisconsin management units as an incentive to increase the harvest. Those hunters with antlerless permits who shoot a deer will be allowed to try for a second one from Monday through Friday of the nine-day season November 17 through 25.

The incentive system is designed to help reduce excessive crop damage caused by high deer populations in Columbia, Iowa, Marquette, Richland and Sauk counties. The season will be tried this year in management units 67A, 70, 70A, 70B, 70E and 71. Unit boundaries and county boundaries are not the same, but both are clearly outlined in the 1984 Wisconsin Hunting Regulations pamphlet. If enough additional deer are harvested in incentive units, agricultural losses in these regions should be reduced.

Antlerless permits limit a hunter to taking only a doe or fawn in the management unit for which the permit is issued. In other units, the hunter may still take any legal deer. This year about 25% of the targeted antlerless harvest is expected to be second deer. Permits for them will be issued locally on a first-come, first-served basis to antlerless

permit holders who have harvested an antlerless deer in one of the incentive deer units.

This year's antlerless quota is much higher than last year's and, with limited access to southern Wisconsin deer range, it's possible that even the incentive program may go undersubscribed. Only if enough landowners take advantage of it themselves or open their lands to those who will, can the southern Wisconsin deer herd be reduced to prescribed overwinter levels.

Current hunting license fees

Sports License — \$26.00
Conservation Patron — \$100.00
Resident Small Game — \$7.50
Resident Deer — \$12.00
Resident Bear — \$12.00
Resident Archer — \$12.00
Trapping — \$12.50
Turkey — \$11.75—stamp
Nonresident Small Game — \$60.50
Nonresident Small Game (5-day) — \$30.50
Nonresident Deer — \$85.50
Nonresident Bear — \$100.50
Nonresident Archer — \$65.50
Nonresident Furbearer — \$125.50
Waterfowl Stamp — \$3.25

One-million hunting licenses = \$14 million

About a million Wisconsin hunting licenses of various kinds were sold in 1983 for just over \$14-million.

The money goes for wildlife management, law enforcement and administrative services. It pays for habitat development, game farm operations, public hunting ground development, research, management, field wardens, special investigators and hunter education. Administrative services include such items as printing and distribution of licenses and laws, accounting, clerical personnel and computer systems.

Deer hunting is most popular. Last year 633,000 Wisconsin citizens bought Deer or Sports licenses. (Sports includes both deer and small game.) This year an estimated 650,000 will be in the woods November 17th through November 25th. About 215,000 will be successful or about one in three.

License sales for 1983 were as follows: Deer 383,000, Sports 250,000, Archery 188,000, Small Game 143,000, Nonresident 27,000, Trapping 19,000, Bear 7,000.

In addition to selling over a million hunting licenses, DNR's license section will issue over 200,000 Hunter's Choice permits; 35,000 goose permits for Horicon and the Central Zone; the pheasant tag required on certain DNR properties, and otter and bobcat tags.

Special hunts

Bong State Recreation Area

Bong, in Kenosha County, features duck hunting from state-supplied blinds and hen-rooster pheasant hunting. Game farm pheasants are stocked frequently. The number of hunters allowed at any one time is restricted, so reservations are advised. Apply on DNR forms. Write: DNR, Route 1, Box 141B, Kansasville, WI 53139.

Sandhill Experimental Wildlife Area

A special deer hunt using the regular season tag takes place here one week before the statewide gun deer season. The area is being managed to increase the number of large, full-antlered trophy bucks. Permits for the first day either sex hunt are issued by advance reservation only. Applications must be postmarked no later than Oct. 5 and are available at most DNR offices. Thereafter, permits are issued on a first-come first-served basis until the kill objectives are reached. Daily permits for small game are also available

at the Sandhill office near Babcock, Wood County.

Muzzle-loader Only Deer Hunt

Governor Dodge (Unit 70C), Blue Mound (70D) and Perrot (61A) State Parks are restricted to hunters using muzzle-loading rifles and holding hunter's choice permits for those quota areas.

National Wildlife Refuges (NWR)

Horicon NWR offers early archery and shotgun deer seasons, plus pheasant and cottontail rabbit hunting. For information on dates and areas write US Fish and Wildlife Service, Horicon NWR; ATTN: Refuge Manager, Route 2, Mayville, WI 53050 or phone 414-387-2658.

Trempealeau NWR in western Wisconsin offers small game hunting, late season archery by refuge permit and two days of gun deer hunting through the hunter's choice permit system, deer management unit 61B. For details write US Fish and Wildlife Service, Trempealeau NWR; ATTN: Refuge Manager, Route 1, Trempealeau, WI

54661 or phone 608-539-2311.

Necedah NWR in north central Wisconsin offers deer and turkey hunting. For details write US Fish and Wildlife Service, Necedah NWR; ATTN: Refuge Manager, Necedah, WI 54646 or phone 608-565-2551.

Fort McCoy Military Reservation

Fort McCoy in Monroe County issues permits for gun deer, muzzle-loader (Nov. 3-4), bow deer and small game hunting. Most gun deer permits are already issued.

Write for permit application forms to: Morale Support Activities Office, ATTN: Permit Sales, Building 1130, Fort McCoy, WI 54656. Small game and archery permits must be applied for in person Monday through Friday, 9:00 a.m. to 3:00 p.m. A recorded message on which areas are open to hunting each day can be heard by calling 608-388-GAME. Other questions concerning areas open to hunting should be directed to 608-388-3337 (formerly called the hunter hotline).

Trespass decriminalized

Landowners liability limited

Starting October 1st of this year a new law decriminalizes trespass in Wisconsin with offenders to receive a ticket similar to a traffic citation.

A maximum fine of \$1,000 is specified in the new law although the actual amount will depend on the situation. As in the past, enforcement will be carried out by local police officials not DNR wardens.

The decriminalization law also limits landowner liability for recreational activities on their property. Among activities for which liability is limited are hunting, fishing, trapping, camping, picnicking, exploring caves, nature study, bicycling, horseback riding, bird watching, motorcycling, hiking, snowmobiling, skiing and sight-seeing.



Tests for chemical contamination of wildlife

DNR is concerned that some of the wildlife it protects is showing signs of chemical contamination and has started tests of wildlife for signs of pesticides, PCBs and heavy metals. Edible meat portions from deer, waterfowl, woodcock, raccoon and pheasant from across the state will be collected and analyzed.

The tests will assess the quality of wild game which hunters harvest to determine whether there is any risk in eating it. Experience in monitoring fish indicates that waterfowl and game may be valuable monitors of how and where chemicals move through food chains and the environment.

DNR will sample game species which are commonly hunted and consumed. Animals using several types of environments (air, land and water) will be sampled first. Animal feeding habits, longevity, geographic distribution and migration patterns will also be considered in the sampling program.

In all, approximately 130 animals will be analyzed for PCBs, 17 agricultural pesticides and seven heavy metals at a cost of \$30,000.

Hunting season dates and outlook

Species	1984 Dates and locations	Game supply compared to 1983	Hunting prospects
Coyote	Statewide, all year	Improving	Fair to good. Best in north.
Snowshoe Hare	Statewide, all year	No change	Fair. Best in north.
Turkey	5 units — 3 hunting periods between Apr. 18 and May 6, 1985	Up	Good. Best in south-west counties near Mississippi R.
Ducks	Statewide, dates published about Sept. 15	Down	Fair. Best along Mississippi R. and in east counties.
Canada Geese	Statewide, dates published about Sept. 15	Improving	Fair to good. Best in east central portion of the state.
Woodcock	Statewide, Sept. 15—Nov. 18	No change	Good. Best in northern 1/3 of state.
Bear	Statewide: Bow: Sept. 15—Nov. 11 Gun: Sept. 15—Sept. 30	Down	Fair. Best in northern forests.
Gray and Fox Squirrel	Statewide, Sept. 15—Jan. 31	Improving	Good. Best in southern 2/3 of state.
Jackrabbit	Statewide, noon Oct. 20—Nov. 15	No change	Poor. Not abundant in any region.
Cottontail Rabbit	North: Sept. 15—Feb. 28 South: Noon Oct. 20—Feb. 28	Down	Good. Best in southern 2/3 of state.
Ruffed Grouse	North: Sept. 15—Dec. 31 South: Sept. 15—Jan. 31	Improving	Fair. Best in western Wisconsin.
Sharp-tailed Grouse	North only, Oct. 20—Nov. 11 (some closures)	No change	Poor. Not abundant in any region.
Raccoon	Residents statewide, Oct. 20—Jan. 31 Nonresidents statewide, Nov. 3—Jan. 31	Improving	Good. Best in south-west and west central.
Bobwhite Quail	Statewide, noon Oct. 20—Dec. 12	Down	Fair. Best north of Wisconsin R. in southwest Wisconsin.
Pheasant	Statewide, noon Oct. 20—Dec. 12	Wild birds down	Poor to fair. Best in southeast 1/4 of state.
Hungarian Partridge	Statewide, noon Oct. 20—Dec. 12	Down	Fair. Best in counties near Lake Winnebago and Lake Michigan.
Red and Gray Fox	North of Hwy. 64: Oct. 20—Jan. 31 South of Hwy. 64: Nov. 3—Jan. 31	No change	Fair to good. Best in west central and southern Wisconsin.
Bobcat	North of Hwy. 64: Oct. 20—Dec. 31	No change	Poor. Not abundant in any region.
Deer	Gun: General Nov. 17—Nov. 25 Bow: Statewide Sept. 15—Nov. 11 Dec. 1—Dec. 31	Up	Excellent. Most deer in central Wisconsin, trophy opportunities in north.

Stop the Poacher

Report Violations
TOLL FREE HOTLINE
1-800-TIP-WDNR
(847-9367)

24 Hour — Confidential

Group deer hunting

A new state law allows a group of gun hunters to shoot as many deer as there are members in the hunting party. Anyone in the group can kill a deer for another if both of the following conditions exist:

At the time and place of the kill, the person who kills the deer is in contact with the person for whom the deer is killed.

The person for whom the deer is killed possesses a current, unused deer carcass tag which is authorized for use on the killed deer.

"Contact" means visual or voice contact without the aid of any mechanical or electronic amplifying device other than a hearing aid. "Group deer hunting party" means two or more hunters all using firearms, each of whom holds an individual license to hunt deer.

It is critical that the hunter who shoots a deer for another be in visual or voice contact with the person for whom the deer is intended at the time of the kill. The tag must be attached to the deer without delay and the deer cannot be left unattended until this is done. A bow and arrow or crossbow cannot be used to kill a deer for a member of the party.

Turkey hunting continues

Wisconsin's third consecutive turkey hunt in recent years will be held next spring with the birds rapidly expanding their range following stocking in Buffalo, western Dane, Iowa, Lafayette, Richland, Sauk and Vernon counties. Last season 1,950 permits were issued and 308 birds were taken.

Next season's framework consists of three Thursday through Monday time periods beginning on the Thursday nearest April 21. **Landowners owning at least 50 acres in an open hunting zone (or an eligible person designated by the landowner) receive priority for up to 20% of the permits issued.** Turkey hunters are reminded to get permit applications in the mail no later than November 2, 1984, to receive consideration for the 1985 hunt. DNR offers turkey hunter education clinics beginning in the latter part of January.

New turkey hunting rules include:

1. Number of permits (three periods combined): Zone 1-450; Zone 2-525; Zone 4-450; Zone 9-300; Zone 10-450.

2. Zone 10 has been modified to exclude some lands located between Fennimore and Potosi.



Theresa experimental goose hunt

An experimental Canada goose hunt will be held this fall around the Theresa Marsh Wildlife Area in northwestern Washington and eastern Dodge counties. It will test the feasibility of controlling the goose harvest by requiring geese to be registered on the day of kill much like southern Illinois. The rules allow the hunter the opportunity to take more than one goose per season.

The experimental hunt will test acceptance of a registration system and its potential for other areas in Wisconsin.

A 1:00 p.m. closing will allow geese to establish undisturbed afternoon feeding flights. Two geese per day will be an incentive for hunters willing to locate feeding areas, obtain hunting permission,

set decoys and prepare blinds so they can once again enjoy a typical "Canadian Prairie" goose hunt.

All hunters not receiving a 1984 Horicon/Central Zone Permit are eligible to participate in the Theresa hunt. Hunters may choose not to apply for Horicon to insure eligibility for Theresa.

All participants must pick up their permits **in person** from the goose registration building located near the Village of Theresa Station between 9:00 a.m. and 4:00 p.m. on October 8-12. Permits will also be available at the registration station during the season starting on Saturday, October 13 between 5:30 a.m. and 3:00 p.m. each day.

The season will open on October 13 and close when 800 geese have been registered or the season length is reached.

Hunting hours will be from one-half hour before sunrise until 1:00 p.m. each day.

All geese harvested must be registered by 3:00 p.m. on that day.

The season bag limit is four geese with two tags issued at a time. The daily bag limit is two.

Blinds will be required for hunting on all private property within the Theresa Zone. Hunting from blinds is not required on state-owned lands in the zone.



Mandatory hunter education

Starting next year, a certificate of accomplishment in firearms safety and other skills will be required before a person born on or after January 1, 1973 is issued a hunting license. **A new law makes instruction mandatory including DNR's current voluntary program which is expanded to include not only firearms but also wildlife management, conservation and the responsibilities of hunters to wildlife, environment, landowners and others.**

AIR POLLUTION CONTROL PERMIT APPLICATION
FORM 4500-1S: STACK IDENTIFICATION

DEPARTMENT OF NATURAL RESOURCES

WASTEWATER FACILITY MONITORING ID FORM
SECTION 147.08, WISCONSIN STATUTES
FORM 3400-74 REV. 7-83

SEC
FAC

State of Wisconsin
Department of Natural Resources

CONTROL EQUIPMENT
AIR POLLUTION CONTROL PERMIT APPLICATION
Section 144.02, WIS. STATS.

MAIL TO:

DEPARTMENT OF NATURAL RESOURCES
WPDES PERMIT SECTION
BOX 7921
MADISON, WISCONSIN 53707

DISCHARGE PERMIT APPLICATION — SHORT FORM C
WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES)
CHAPTER 147, WIS. STATS.
FORM 3400-26 REV. 6-82

Appl. No. _____ Date Rec'd. _____

PLEASE
FILL IN

FULLY

LEAVE

LEAVE BLANK

Permit system makes business purr

OLIVER D. WILLIAMS,
Permits Coordinator

To help industry, the time line on issuing permits has been shortened and de-mystified, but solid protection for the environment is still top priority.

It takes a fairly fast reader five minutes to scan a page of Wisconsin Statutes.

If your eyeballs could take the strain, you could — reading steadily for eight hours a day — skim the entire set of statute books in only 52 days!

Those 5,000-odd pages constitute the “dos” and “don’ts” of our Wisconsin lifestyle. They cover everything from birth certificates to embalming. And — despite the fact that many people earnestly believe that DNR is a power unto itself — the statutes are the sole source of authority for Department of Natural Resources operations.

Of those 5,000 pages, how many do you think are devoted to establishing environmental regulations? Twenty percent? Five? Maybe one? The fact is, there are only six chapters dealing with water, air and solid waste issues — out of some 900.

And these take up less than 120 pages, or roughly 2% of the total. Yet, to read the bumper stickers, one might think DNR was the only power on earth.

Ironically, those tailgate slogans may do more to hype DNR’s impact than do the statute books. It’s the IRS syndrome: not one in 100 of us has ever been audited, yet we have an inordinate fear of the Internal Revenue Service. The same with DNR.

It’s not unusual to hear someone explain, when caught doing something without a permit, that he didn’t file an application because he feared it would be denied.

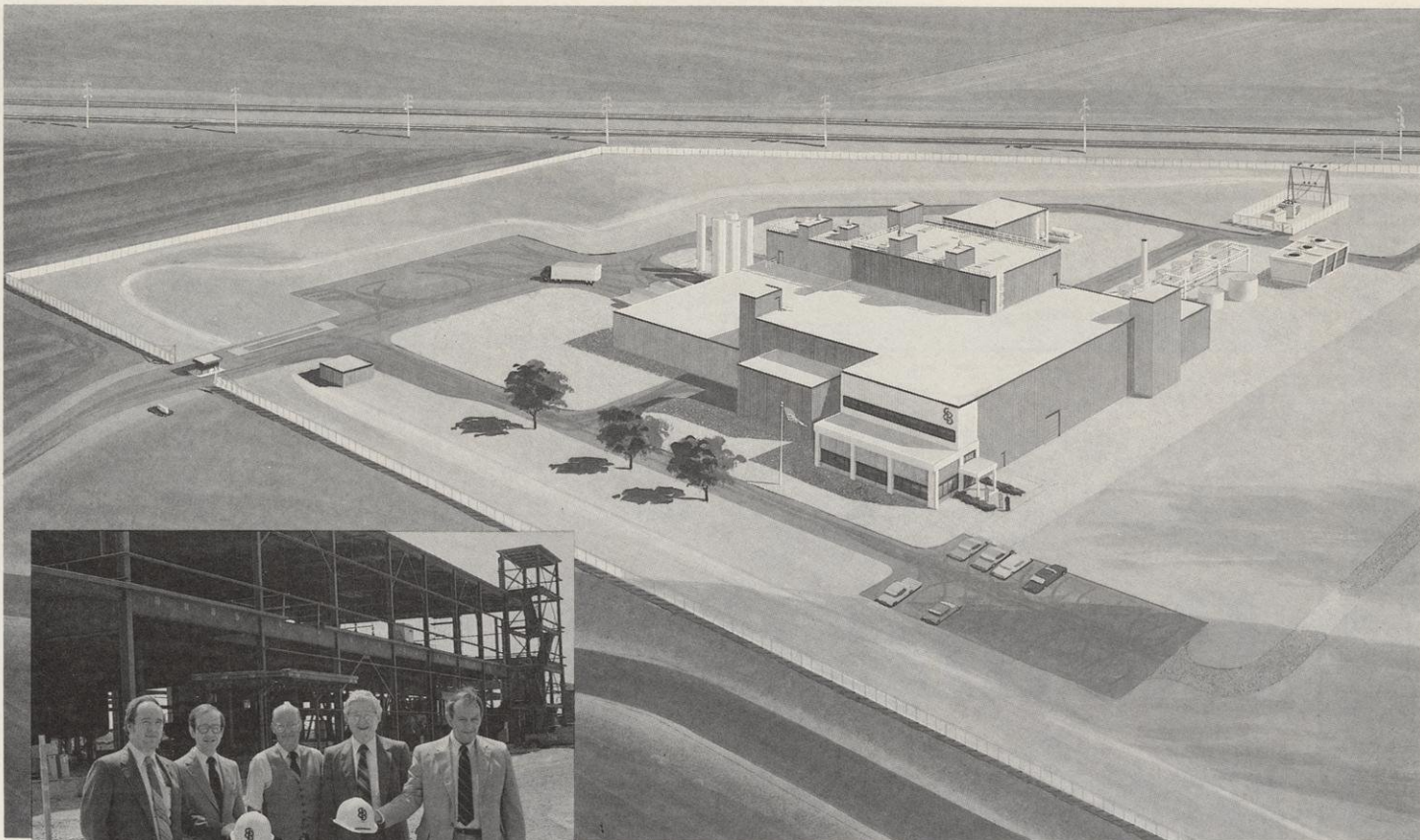
Denial, believe it or not, hardly ever happens! DNR is a “permitting” agency.

In those 100-plus pages, the Legislature recognizes that in some industrial processes water must be used, and will get polluted; that vapors will be given off; that fuels must be burned; that toxic wastes will be generated; that sludges and trash must be disposed of.

The mandate given DNR is to set standards, or establish conditions that will allow these waste streams to be discharged safely.

Viewed from the public’s perspective, DNR’s charge is to prevent the potential permittee from infringing on the rights of others. The air, water and soils are not to be fouled, or misappropriated.

Technology, however, still has its limits. Electrostatic precipitators remove almost 100% of the particles which make smoke visible, but sulfur dioxide and invisible gases still go up the stack.



Prototype for Wisconsin's coordinated permit system was established in planning and construction of this new \$30-million plant for Enzyme Bio-Systems Ltd., in the Beloit Industrial Park. Prompt attention to permits and approvals played a significant role in the decision to locate there rather than in another state. At least 30 new jobs will be created.

(Inset) Completion of the building's framework is celebrated by (l to r) Edward A. Kuske, president; Rolf Wegenke, director of the Permit Information Center; James Chapman, director of Regulatory Affairs for the company; Herb Holt, Beloit City Manager and George Babcock, vice-president, manufacturing.

Secondary treatment plants stabilize about 90% of the organic wastes in sewage, but may not trap all of the PCBs or other toxics that come down the pipe. Those that are taken out wind up in the sludge, and that has to be disposed of somewhere. If wells are to be constructed so that they do not themselves provide conduits for pollutants to reach the groundwater, certain design criteria must be met.

Pollution abatement has become a highly skilled, highly specialized, highly technical profession. The acronyms which have sprung up around it tell the story: RACT (reasonably available control technology), BPT (best practicable treatment), BAT (best available treatment), PSD (prevention of significant deterioration), etc. These are not simple rules-of-thumb that anyone can apply. They require analysis of multiple factors and professional judgment.

For the first half-century after Wisconsin adopted its constitution in 1848, the Legislature itself, in effect issued permits in water regulation matters. But after a while it recognized that it could not write the laws and administer them too. In 1905 it created the Wisconsin Railroad Commission (in 1931 renamed the Public Service Commission) to make those judgments. Authority to administer Chapters 30 and 31 of the Statutes was transferred from PSC to DNR in the late 1960s.

The real history of effective pollution control has been written in the last 15 years. On a human scale, the "science" of air pollution control and

solid waste management is just reaching adulthood. National standards set by the Congress and US Environmental Protection Agency in recent years have forced all states to get into the act. The ploy which industrialists once used — threaten to relocate unless environmental restrictions were eased — is no longer valid.

The regulated community may have no "environmental islands" to run to, but there are other concerns. The most recent issue raised is the speed — or lack of same — which agencies display in processing permit applications.

In 1983, Governor Anthony Earl created a number of study groups to examine issues affecting the state's economy. One of these was the "Governor's Task Force on the DNR Permit Process." Members were representatives of business and industry. They carried out independent studies, solicited statements, interviewed state and university employees and held a number of discussion sessions.

The Task Force report, issued last October, contained several recommendations for streamlining the permit processes and making them more understandable. One of the key findings was that "the regulated community generally has no quarrel with permitting or with environmental protection. What is troublesome is uncertainty and delay."

Among the recommendations which subsequently were enacted into law were: (a) creation of a Permit Information Center within the Department of Development; (b) direction to all regulatory agencies to establish time frames within which decisions will be made on permit applications; and (c) a dictate that "scoping" procedures

be established so that business people wanting to start or expand operations in Wisconsin can be fully informed of all permits needed and the processes for obtaining them.

Governor Earl credits the special legislative session on economic development with fostering "a new spirit of cooperation between state government and business."

Paul Hassett, president of the Wisconsin Association of Manufacturers and Commerce, concurs that "setting up a permit center where business firms can learn where to obtain permits, how long it will take, how much it will cost, and even more important, do it with a dedicated sense of helping the business person solve a problem, is a giant step in the right direction."

The Permit Center has a toll-free number (1-800-HELP BUSINESS), and Director Rolf Wegenke reported a total of 589 contacts in the first five months of operation during 1984. The lion's share of those calls (394) were for information which the Department of Development could provide. Curiously, despite the attention given to the DNR permit processes, only 22 of the referrals were to this department. More issues were directed to the Department of Revenue (43) and the Department of Industry, Labor and Human Relations (30). The balance was divided among a dozen other offices or agencies.

Referrals reported by DOD Permit Information Center

Month	Dept. of Development	Dept. of Revenue	DNR	DILHR	Regulation & Licensing	Secretary of State	Dept. of Ag	DOT	DH&SS	Others	Monthly Total
January	63	13	6	6	5	3	3	1	1	0	101
February	84	8	4	2	1	4	3	4	2	8	120
March	83	6	3	5	2	0	5	0	0	8	112
April	94	7	3	7	3	0	7	1	3	13	138
May	70	9	6	10	1	2	3	4	5	8	118
Totals:	394	43	22	30	12	9	21	10	11	37	589

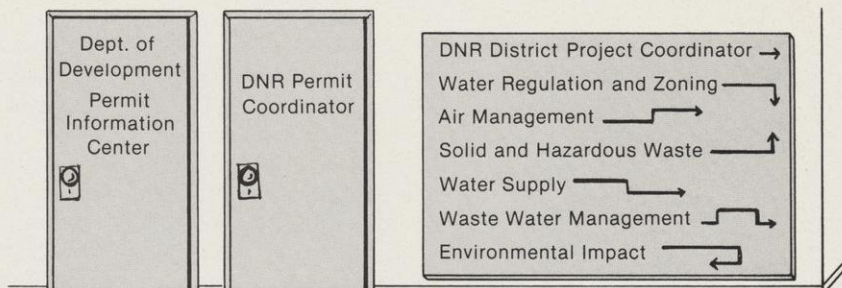
Environmental considerations must be a part of the planning process for today's business.

DNR is taking its responsibility to maintain efficiency in the permit process seriously. Three staff committees have been established to review procedures in the issuance of permits and approvals, the preparation of environmental assessments and statements, and coordination of large and highly complex projects like the Exxon mine, for example. A permits coordinator has been named, "scoping" procedures developed, and regular liaison maintained with both the Permit Information Center and the Small Business Ombudsman.

All DNR administrative codes will, prior to the end of 1984, have been amended to include time frames for the processing of permit applications. Special attention is given to the impact of new codes on small businesses in compliance with another new law.

DNR is sharpening the focus of its regulatory activities so that more staff time can be dedicated to priority issues. In the water quality field, for example, those who discharge only relatively innocuous fluids — condensate from an air conditioner, for example — may qualify for coverage under a "general permit." Processing time is cut, and reams of paper saved.

Similarly, in the air management program, rules are being written so that small sources can be exempted from the permit process. With the help of industry representatives and environmental coalitions, it was possible to make a 30% cut in



Applicants for DNR permits may still go directly to the appropriate bureaus, but they now have an option. The Permit Information Center and the DNR Permit Coordinator can provide basic information and guidance through the regulatory maze.

the number of air pollution sources regulated by individual permits.

For larger projects which are subject to full permitting procedures, the emphasis is on information. Project sponsors need to know that there are limitations on what can be built where air quality standards are not yet being met (non-attainment areas) or where effluent discharges exceed the assimilative capacity of a stream (wasteload allocation sectors). Environmental considerations must be a part of the planning process for today's business. Those who employ knowledgeable staff, and competent consultants will usually find that their proposals move smoothly through the regulatory rollers. Incomplete plans or poorly conceived ideas serve only to snarl the process and can result in missed opportunities for waste recovery and reuse, which could produce greater efficiency and higher profits.

For its part, DNR seeks out technically skilled employees who are dedicated to protecting the environment. If the guidelines established by the Legislature in those pages of environmental law can be met, our business is to issue the necessary permits.

Wildlife is big business

HARRY LIBBY,
Program Analyst
Bureau of Wildlife Management

The annual dollar impact of wildlife in Wisconsin is nearly \$760-million. That money bounces around the economy and helps make the good life here go.

Someone is always fiddling with figures, and the US Fish and Wildlife Service has come up with some that boggle the mind. A report entitled "1980 National Survey of Fishing, Hunting, and Wildlife Associated Recreation" was recently published. This is the sixth in a series of US Census Bureau fishing and hunting surveys conducted every five years since 1955. The 1980 survey differs from previous ones because it provides data on nonconsumptive wildlife-associated recreation (bird watching, photography, feeding etc.) and it summarizes individual state reports in addition to the national information. The surveys were financed from manufacturers' excise taxes on hunting and fishing equipment. Information was gathered both by telephone and in-person interviews. In Wisconsin, almost 3,000 households were surveyed.

The survey is one of the oldest and most comprehensive tools for measuring recreational changes over time. It is designed to gather information about how people fish, hunt and enjoy other forms of wildlife-associated recreation. The purpose is to gather information on the numbers of anglers and hunters in our country (including Wisconsin), as well as how often they participate and how much money they spend on these activities. This 1980 survey was the first to gather extensive information about those who observe, photograph or feed wildlife.

On the national scene, one of every two adults took part in some form of outdoor activity involving fish and wildlife during 1980, and these folks spent almost \$40-billion in their recreational pursuits. This makes fish and wildlife bigger business than the nation's two largest retailing companies combined (Sears Roebuck and Safeway Stores). Sales generated in 1980 by fish and wildlife exceeded that of the Ford Motor Company.

Among the nearly 100-million people engaged in fish and wildlife-related recreation were 42-million anglers age 16 and older and 17-million hunters. Eighty-three million observed or photographed wildlife. These data also show that a majority of outdoor enthusiasts pursue wildlife

activities other than traditional fishing and hunting; fully 65% of all anglers and hunters also engage in "nonconsumptive" wildlife recreation, such as photography and wildlife observation.

What do these numbers mean when we take a close look at Wisconsin?

Looking first at traditional hunting information: 673,000 hunters spent 11,774,900 days afield for an average of 17.5 days per hunter. The data show that 570,400 were big game hunters, 451,200 were small game hunters and 146,700 were migratory bird hunters. The number of people in Wisconsin in the nonconsumptive category was estimated at 3,580,800, over 75% of our state's population!

Sales generated in 1980 by fish and wildlife exceeded that of the Ford Motor Company.

Some of the more revealing Wisconsin information pertains to expenditures. The survey shows that in 1980, hunters spent nearly \$247-million in the state pursuing their sport. That's a hefty amount. Equipment expenditures led the list, followed by food and lodging and transportation. On an overall basis, all hunters spent an average of \$367 during the one-year period. Big game hunters spent nearly \$101-million (\$177 average), small game hunters \$43-million (\$95 average) and migratory bird hunters \$15.25-million (\$104 average).

Expenditures for the nonconsumptive users are not available for Wisconsin alone, but are available for Wisconsin and four other Great Lake States as a group. In aggregate, nonconsumptive users averaged \$139 during the year, which would mean a total of \$498.6-million for the 3.5-million Wisconsin users.

Trapping information was not gathered in the survey. However, DNR records over the last 10 years show an average total annual pelt value from trapping of \$9.6-million. Other data from surveys of trappers suggest this number should be increased to about \$13.8-million to account for trapper expenditures and the furbuyer industry.



About 75% of Wisconsin's population, or more than 3.5-million people engage in some form of non-hunting wildlife recreation. They spend nearly \$500-million per year on it for such things as equipment, lodging, food and transportation.

DNR photo by Jean B. Meyer, Courtesy of Berg-Pearson Sporting Goods, Madison



Some aspects of hunting can't be described in terms of money.

Photo by David L. Misterek



Most of the \$247-million Wisconsin hunters spend annually goes for equipment. The state receives a portion of federal excise taxes collected on arms and ammunition.

DNR photo by Sara Ballard, Courtesy of Berg-Pearson Sporting Goods, Madison

A conservative estimate then, of the annual economic impact of Wisconsin wildlife resource users would be:

USER	ECONOMIC IMPACT
All Hunters	\$246,870,900
Nonconsumptive Users	\$498,626,400
Trappers	\$ 13,800,000
Total	\$759,297,300

One could well ask, "What is it costing the state to manage and protect these wildlife resources?" For 1983-84, the annual DNR budget for the Wildlife Management Bureau was \$9,288,300. Eighty-nine percent of these funds came from the sale of licenses and federal taxes on certain hunting equipment. Only 11% was provided through general tax revenues, spent primarily for land acquisition. When the DNR expenditures for wildlife-oriented work in law enforcement, research and administrative support functions such as secretarial and financial assistance are added in, the rough estimate becomes \$16,750,000. These management costs represent a wise investment for Wisconsin, contributing more than \$45 in economic return for every one dollar invested in fish and wildlife.

Most folks who love the outdoors and wild creatures draw back from putting a dollar and cents value on those things. This is understandable. Some values are intangible. Still, wild things can be valued other than by aesthetics, and a wholesome wild environment is important to Wisconsin's overall health. Indeed, it's important to begin to quantify some of these values, particularly when documenting the impact of proposals that adversely modify or remove wildlife habitat. It's time we catch up and start thinking of wildlife dollar values in addition to other sources of economic return.



Bird feeding is an important non-consumptive wildlife use in Wisconsin.

About 18,000 red fox were trapped in Wisconsin during the 1982-83 season. This is Roy Sebald of Sheboygan, past president of the Wisconsin Trappers Assn.

Photo by L. Sebald



Trapping: a benefit to Wisconsin

ROBERT BLUETT,
Fur Resources Technical Assistant
CHARLES PILS,
DNR Fur Resources Specialist

Trapping is an important part of Wisconsin's heritage. Besides its obvious economic and recreational benefits, it is a valuable aid in the study of certain diseases. It also helps gather biological data and combats furbearer nuisances. But trapping has its detractors.

Some groups believe trapping is inhumane and should be banned.

Photo by Herb Lange

Trapping played a large part in the culture and tradition of early Wisconsin. Centuries ago, Wisconsin Indians such as the Chippewa, Winnebago, and Menominee trapped furbearers in snares and deadfalls for food, clothing, and trade. Furbearers such as beaver were also captured by spearing. Rich fur resources attracted the first European explorers and settlers here. By the time the United States claimed its independence in 1776, the fur trade in Wisconsin was thriving. But lifestyles and fashions changed through the years and trapping gradually faded into the shadows of history.

A vast majority of Wisconsin residents, especially those living in towns and cities, have lost contact with the trapping tradition. However during 1983-84 nearly 19,000 trappers pursued their sport.

In the Badger State, trapping is a privilege limited to licensed Wisconsin residents. Most of today's trappers use various leghold and Conibear (killer-type) traps to harvest furbearers. As the name implies, leghold traps catch and hold furbearers by the foot, whereas Conibear traps grip the targeted species around the neck, quickly killing them. The use of snares is banned in Wisconsin. Live traps are unsuited for most traplines, due to their bulk and inability to catch the more wary furbearers like fox, coyote and bobcat.

Under a directive issued by our state legislature, trapping is regulated by DNR. The Natural Resources Board, which sets policy for DNR, fully realizes the importance of trapping as a harvest tool. Accordingly, the board has mandated that until improved harvest techniques are developed, present trapping methods must continue for recreational, biological and economic reasons.

Trapping is the most efficient way to conduct a continuing harvest of furbearers. In fact, recent harvest data shows that approximately 86% of the nearly one-million furbearers harvested annually in Wisconsin are taken by trapping.





Average annual income of a Wisconsin trapper is \$500 with most making much less.



Trapper Edgar Koeser sets a Conibear trap. Seen by some as more humane than leghold traps, the Conibear kills quickly. This is a beaver set.



Coyote in a leghold trap. Records for 1982-83 show 1,548 coyotes taken by trappers and 2,146 by hunters. Photo by Charles Pils

Because many of these species are active at night, trapping has proven to be a much more effective harvest tool than hunting. Wisconsin law states that muskrat, mink, otter and beaver can be harvested only by trapping. Other furbearers, such as bobcat, coyote, fox and raccoon can legally be both hunted and trapped. Animals protected from hunting and trapping in Wisconsin include endangered species such as Canada lynx, timber wolves and pine marten. Badger and fisher are currently protected by law. However, fisher populations have increased and a limited trapping season will open in 1985.

Trapping has many benefits: (1) It maintains a healthy balance between furbearers, their habitat, and human interests, (2) Provides information on furbearer populations needed to develop management goals and conduct scientific research, (3) Reduces the potential threat to humans and domestic animals posed by wildlife diseases, (4) Helps reduce furbearer-related damage and nuisances, and (5) Creates recreational and economic opportunities.

Biologically speaking, losses which result from regulated trapping are compensated for by a reduction in losses caused by natural mortality factors such as disease, starvation, parasitism and predation.

Twelve of the 17 furbearing species which inhabit Wisconsin are currently harvested on an annual basis. Populations have remained stable or increased during the last decade, despite record harvest numbers. By carefully monitoring yearly harvests and furbearer population surveys, wildlife managers have designed seasons that keep harvests in balance with furbearer numbers.

Sustained harvests are designed to remove a certain portion of the naturally occurring surplus which is produced by every animal population. Few people realize that the annual surplus of some species, like muskrat, may amount to 75% of the fall population. Biologically speaking, losses which result from regulated trapping are compensated for by a reduction in losses caused by natural mortality factors such as disease, starvation, parasitism and predation.

The net product is a spring breeding population that is approximately equal in size for both harvested and unharvested animal populations. A major difference is that the harvested population serves as a source of recreation and income for Wisconsin residents.

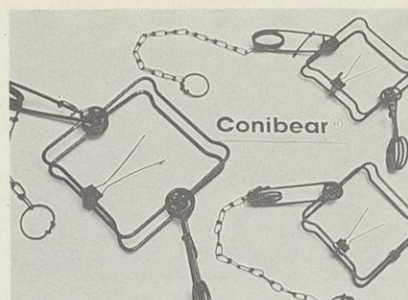
When combined with information about pelt prices and trapper effort, annual harvest estimates provide an index to statewide furbearer abundance. Large or consistent changes in harvest levels alert wildlife managers to the possibility of trouble in a population. Harvest data is also used to make management strategy decisions.

Carcasses provided by trappers have helped wildlife biologists determine age, sex and reproductive characteristics of Wisconsin bobcat, otter, fox, raccoon, beaver and muskrat populations. This information helps determine how a furbearer population is doing. Wisconsin researchers have used leghold and live traps to capture red fox, timber wolves, coyote, fisher, pine marten and skunk. After being fitted with radio transmitters and released, these furbearers have been electronically tracked to collect valuable information about movement and behavior.

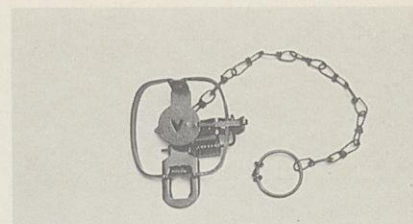
While trapping is not the solution to every wildlife disease outbreak, under certain conditions it can reduce threats to the health of people and to domestic animals. Wildlife frequently serves as a reservoir for rabies, tularemia and other diseases potentially dangerous to humans. Household pets are susceptible to distemper, rabies, heartworm, parvovirus, mange and leptospirosis, all of which can be acquired from unhealthy furbearers. By removing population excesses which promote diseases such as canine distemper, trapping reduces the number of infected furbearers in a population. In a localized situation, trapping can reduce and even stop the spread of a disease outbreak. If an outbreak does occur, precautionary measures such as quarantines or sanitary procedures can then be quickly initiated to protect the public. However, trapping does not lower the prevalence of established diseases such as rabies or canine distemper.

The prevalence and distribution of several wildlife diseases in Wisconsin have been determined from blood samples of trapped coyote, opossum, raccoon, fox and timber wolves. Most recently, raccoon and other small mammals were trapped to map the distribution of Lyme disease, an illness which can cause arthritis and heart complications in humans.

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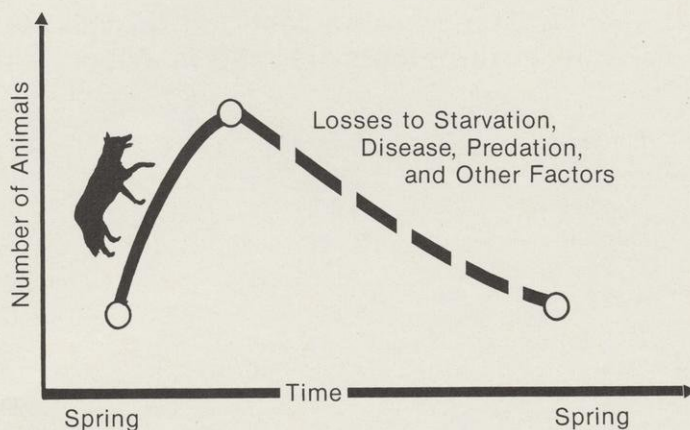
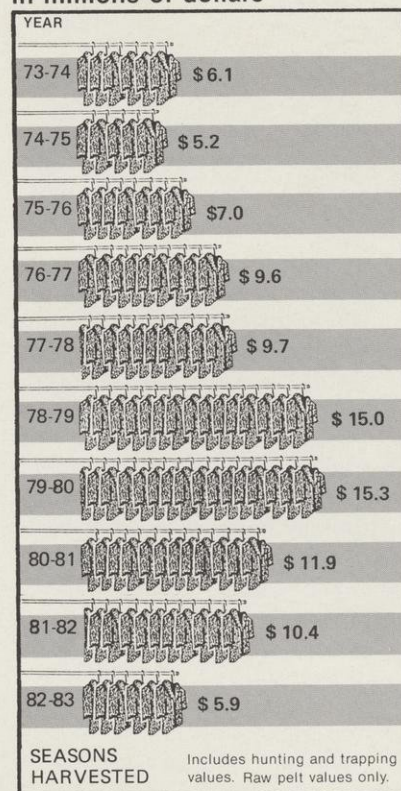


Conibear Trap



Leghold Trap

Fur value of Wisconsin furbearers in millions of dollars'



Annual population cycle of furbearers.

Members of the Wisconsin Trappers Association are currently cooperating in research on canine parvovirus in fox and raccoon. Preliminary results from a southern Wisconsin study show an unusually high occurrence of this disease in animals located where trapping and hunting are normally prohibited. Trapping is an efficient, cost effective means of reducing economic and environmental loss caused by furbearers. Traps can be set to selectively catch a particular species, and in many cases, a single animal responsible for problems. Annual harvests help reduce overabundant furbearer populations which often result in an increase in damage and nuisance complaints.



Average value of Wisconsin pelts is nearly \$10-million per year. Many are sold at sales like this one.

Photos by Charles Pils

In some of Wisconsin's larger cities, commercial pest removers use live traps to capture and relocate raccoon, skunk or opossum which are a nuisance. Bank erosion resulting from muskrat burrows often requires removal of these aquatic furbearers. Although crop and livestock losses caused by furbearers are relatively light in Wisconsin, trapping helps relieve local problems which arise. Liberalized harvest restrictions and limited contract trapping have been implemented to reduce record beaver populations in areas where flooding due to construction of beaver dams has caused considerable damage to croplands, roadways and forests. Prime trout streams have also been negatively affected by beaver activity.

Most Wisconsin trappers pursue furbearers as a source of extra income. Contrary to popular belief, however, trapping is not a "get rich quick" proposition. Active Wisconsin trappers received an average income of \$500 from fur sales during the 1981-82 season.

A decade of harvest and fur values from furbearers trapped in Wisconsin

Furbearer	Harvest	Pelt Price (\$)	1973 — 1982
			Total Yearly Value (\$)
Beaver	17,738	19.06	338,252
Otter	1,164	43.83	51,010
Muskrat	809,068	4.39	3,554,389
Mink	34,293	15.30	524,832
Opossum	8,083	1.79	14,462
Weasel	391	.57	224
Skunk	2,266	2.87	6,510
Bobcat*	90	63.18	5,686
Raccoon*	67,094	19.45	1,304,978
Red Fox*	17,337	44.06	763,868
Gray Fox*	2,845	28.06	79,831
Coyote*	1,584	28.46	45,081

*Includes only trapping values; these furbearers are hunted and trapped in Wisconsin.



A Wisconsin trapper education program was developed in 1982. Pictured behind Author Charles Pils is the first graduating class.

A majority of trappers made less than that. A few, like those who bid thousands of dollars to exclusively trap muskrat and mink at Horicon Marsh, made considerably more than average. Money earned from trapping is most important to students, retired people and other low income groups.

Continued trapping pressure on furbearers such as beaver and otter has made these species extremely wary and difficult to catch. A successful trapper must possess an intimate knowledge of each furbearer's habits and habitat. In a national survey, trappers ranked second out of 20 groups questioned about their knowledge of wildlife and related issues.

Each year, an average of 1.3-million recreation days are enjoyed by Wisconsin trappers. Trapping contributes approximately \$14-million per year to Wisconsin's economy. An average of \$9.6-million is accounted for by original pelt sales. The remaining \$4.4-million is money spent by trappers on gas, groceries and equipment. In addition, local Wisconsin fur buyers make a profit when they buy pelts from trappers or hunters and then sell large collections to out-of-state or foreign fur dealers.

Organizations such as the National Wildlife Federation, The Wildlife Society, Wildlife Management Institute, Wildlife Disease Association and International Association of Fish and Wildlife Agencies support trapping as a necessary wildlife management tool. During recent years, however, trapping has been subjected to increasing criticism from special interest groups such as the Fund for Animals, Inc., and Friends of Animals, who claim that traps are inhumane and should be banned in the United States. Trappers have responded by organizing an aggressive defense of their sport. One positive effort toward this goal was the development of a trapper education program by DNR and the Wisconsin Trappers Association during 1982. This ongoing program offers courses which teach trappers the history, ethics, laws and techniques of their sport as well as some basic furbearer ecology.

Each individual must make his or her own decision about the values and ethics of trapping based upon biological facts and personal convictions. Progressive furbearer management, improvements in harvest technology, and greater public environmental awareness are necessary if trapping is to continue in Wisconsin.

A tadpole diary

DAVID L. SCHIEDERMAYER, *Wauwatosa*

The universe in a bowl of water!

Jon and I dipped into the pond edge and brought up a strand of eggs intertwined in algae. We put them in a bucket with a small amount of pond water, surprised to see all the emerging creatures — daphnia, tubifex worms, a tiny fish. This small system merited close observation. Diaries have been kept for worse reasons than this.

May 10—Drive home with ecosystem in ice bucket. At home, set up old goldfish bowl with pump, filter, gravel, slate stone. Poured in pond water and dechlorinated water. A damselfly larvae swims up the side. One tadpole has hatched out already and careens madly around the eggstrings. Only one daphnia to be seen.

May 11—Tadpole eggs have yellow and black mix of colors and are elongating. No sign of the fish. Tiny swirling water bugs make an appearance.

May 12—A flashlight at night reveals that the fish has a bit of a pot belly. He is eating tiny organisms. The tadpole is slightly larger. All the eggs are now long and black and contain trapped tadpoles. The damselfly has molted. Its wide head and huge eyes make it the largest and most fearsome citizen. But a thin, wormlike creature darts in and out of a cocoon it is making — is this a stonefly? The bottom of the bowl is covered with fine green algae. Tiny one millimeter snails course up and down the glass.

May 13—Tonight the tadpoles hatch in force. They hang vertically, like tiny black commas, on their jelly strand. The older, larger tadpole looks different than these and has a greenish tint. I consult Albert and Anna Wright's epic tome, *The Handbook of Frogs and Toads*. They state that toads (*Bufo Americanus*) lay their eggs in strands. Toads breed from April 5 to July 25, peaking on April 30. The 4,000 to 8,000 eggs, each one millimeter, hatch in three to 12 days. May 13 would be just about right. The leopard frog, also an inhabitant of our source pond, lays an egg mass 10 centimeters in diameter, and the tadpole is greenish. Perhaps the large tadpole is a leopard frog, *Rana pipiens*. Or it may be a spring peeper, *Hyla crucifer*, since these lay 800 to 1,000 eggs singly, and one of these may have fallen into the toad string — an ugly duckling. I ponder this question, my glasses reflected in the glass globe. Tonight, new missile systems are being invented. There are new developments in the Middle East. But just for now, I will peer into this sphere, for here is a world too. Not a simpler one, though.

The wormlike creature seems nested in deeper, and I see less of its darting movements. But a daphnia is hiding at the corner of the slate, and its movements catch my eye. The fish swims past. And even in one day, the snails look bigger. The question still remains: who will eat whom, when?

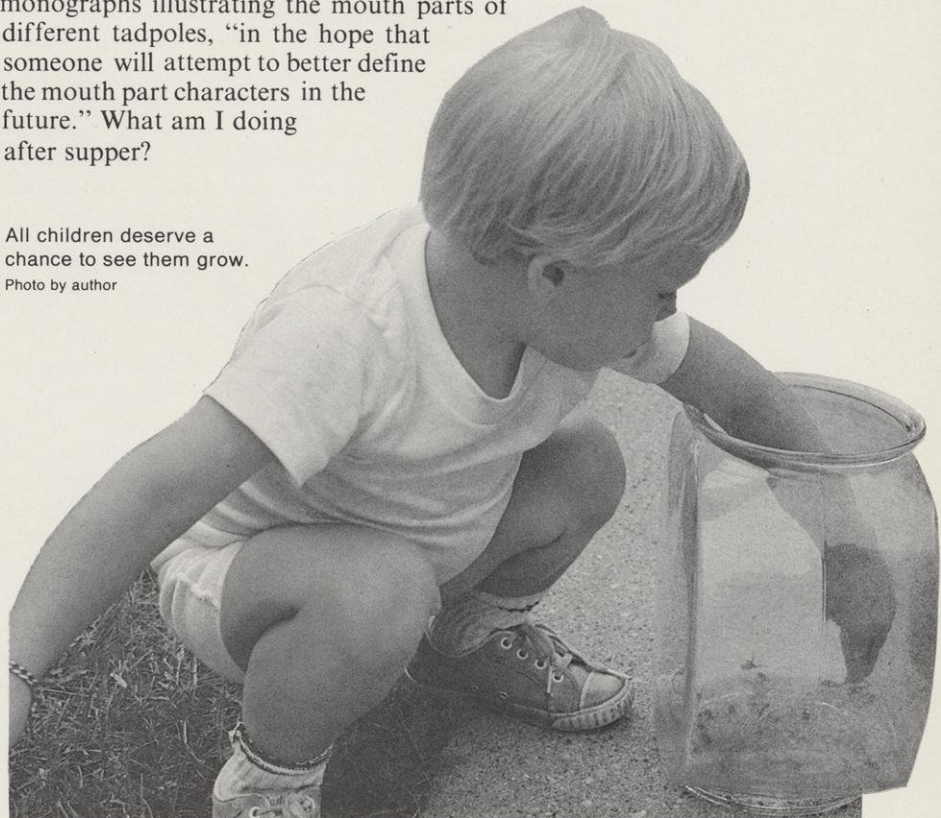
May 14—Rafts and rafts of tadpoles line up. Occasionally, one of them moves. But for the most part they are growing, waiting, taking shape. I begin to worry that I took all 8,000.

May 15—There are 246 tads — count them — spread around the fishbowl. They are now more active. The fish is growing. I add a couple flakes of fish food to the ecosystem.

May 16—They are all a bit bigger, their pale bellies fatter. But what are they eating? Their mouths are plastered to the glass. There is very little algae there. The fish flakes are undisturbed. But the water is clear and well oxygenated. They appear healthy, and they are everywhere. God is bountiful with His production. These tadpoles are just a fraction of what must be hatching in the pond.

May 17—Now the flakes are gone. Aha. They eat! Wright and Wright write rightly, "The tadpole has horned ridges or combs on its lips for scraping food. Each type of tadpole has a different type of mouth." They then show an incredible series of monographs illustrating the mouth parts of different tadpoles, "in the hope that someone will attempt to better define the mouth part characters in the future." What am I doing after supper?

All children deserve a chance to see them grow.
Photo by author



May 18-Another pinch of flakes has been devoured. These tads know how to use their mouth parts. Their undersides show multiple loops of food-filled bowel — in fact, the finely chopped flakes are easily visible. How many millimeters of tadpole gut are required to digest one flake? Do they get indigestion?



May 19-These littlenesses wag their tails like dogs at the dish when the flakes hit the surface. They are like sperm, headed for the egg.

May 20-Another time they move is when they're hungry. Then they seem to be in a frenzy. When they're full, they sink to the bottom like hit subs. Haven't seen the worm for a while. Damselfly larvae is dead and disappeared. Fish growing fast.

May 21-Josh and Robin came over and Jon and I decided they needed a few tadpoles. We gave them six, some good aged water and flakes. Then we helped carry their bucket to their house. When we returned, the remaining pollies seemed agitated. Perhaps they felt we had sent their comrades to their deaths. But all little girls and boys deserve a chance to see tadpoles grow. We give them flakes as a peace pipe to quiet them down.

May 22-Had to rescue a dozen inquisitive tads out of the filter. They were exploring on top of it and got sucked through the holes. Then I tripled all tadpole rations. Not all pigs live on dry land.

May 23-Already they have quadrupled in size. The question is whether they will need to expand to a 10 gallon tank. Like any mass producer of wildlife in an unnatural environment, I'm worried about epidemic diseases.

May 24-Seemed fitting to visit the pond site. Can't see any tadpoles at all in the murky water, but the bottom must be full of them. They are hiding from fish, insects and other predators. Back home in the fishbowl, the tads rest easy.

May 25-The bowl water is becoming murky and smelly too. The tadpoles, by toughness and appetite, have survived, but the insects and the fish are gone. Waste carpets the floor of the globe. Still, they eat and defecate.

May 26-Big day, lot of work. Took out the old 10 gallon tank that Jon had been throwing toys into and filled it with water. Jon was really excited about it and seemed older and wiser so we took the chance and set it up beneath the standard guppy tank we always have set up. Jon promised he wouldn't throw toys or soap into the vulnerable tank. When the water, gravel and plants were ready we eased the pollies in. A fresh start! The big city!

May 27-The larger tadpole is very portly. The little black tadpoles, only half his size, are sprouting tiny black legs. He must be a leopard frog — he's

so big. But no legs on him at all. As for the 14-day-old toad tadpoles — they are using training wheels already.

May 28-One ounce of fish food daily for the several hundred tads. Time to look for alternative cheaper foodstuffs.

May 29-After we fed the little piggies tonight, I slipped in a leaf of lettuce, but they didn't seem interested. Jim, our upstairs neighbor, asked what we're going to do with 200 toads. Easy. Let them loose, a solution to the mosquito problem.



They'll have even bigger mouths later. Sometimes I wonder, even now, if they're pure vegetarians. Wright and Wright don't comment on this, and Cochran and Goin in *Reptiles and Amphibians* stay clear of this controversial area. But they do state, "There is no mistaking a frog (or toad). The lack of a tail and elongated hind legs distinguish it at a glance."

May 30-The top of the aquarium is like a clear mirror, and some tads swim upside down, doing a backstroke below the mirror. Do they gaze like Narcissus? Do they fancy themselves the most important toad in the world? Surely they must know that even their own mother wouldn't claim them. But would she mistake them?

May 31-These tadpoles ride the flakes down like bucking bronchos, cast about by the current, careless in their crystal corral. Not all cowboys chew tobacco. These are bowlegged too.

June 1-Jon is getting the hang of feeding them. The pollies are growing larger, widespread, toad-like eyes. Their bellies are flattening, becoming opaque. They don't even like rotten lettuce.

June 2-My hand slipped today and I put in too much fish food. Hope they can clean it up without too much pollution.

June 3-Although the large tadpole still lacks legs, the small ones have fully developed back legs with the joint and webbed feet.

June 4-No food today. Founders day off.

June 5-The little toad tads are now one centimeter long. Wright and Wright say they will grow to 1.5 centimeters, then shrink, losing their tail, as they transform into one centimeter toads, 50 to 65 days after hatching. This is day 23.

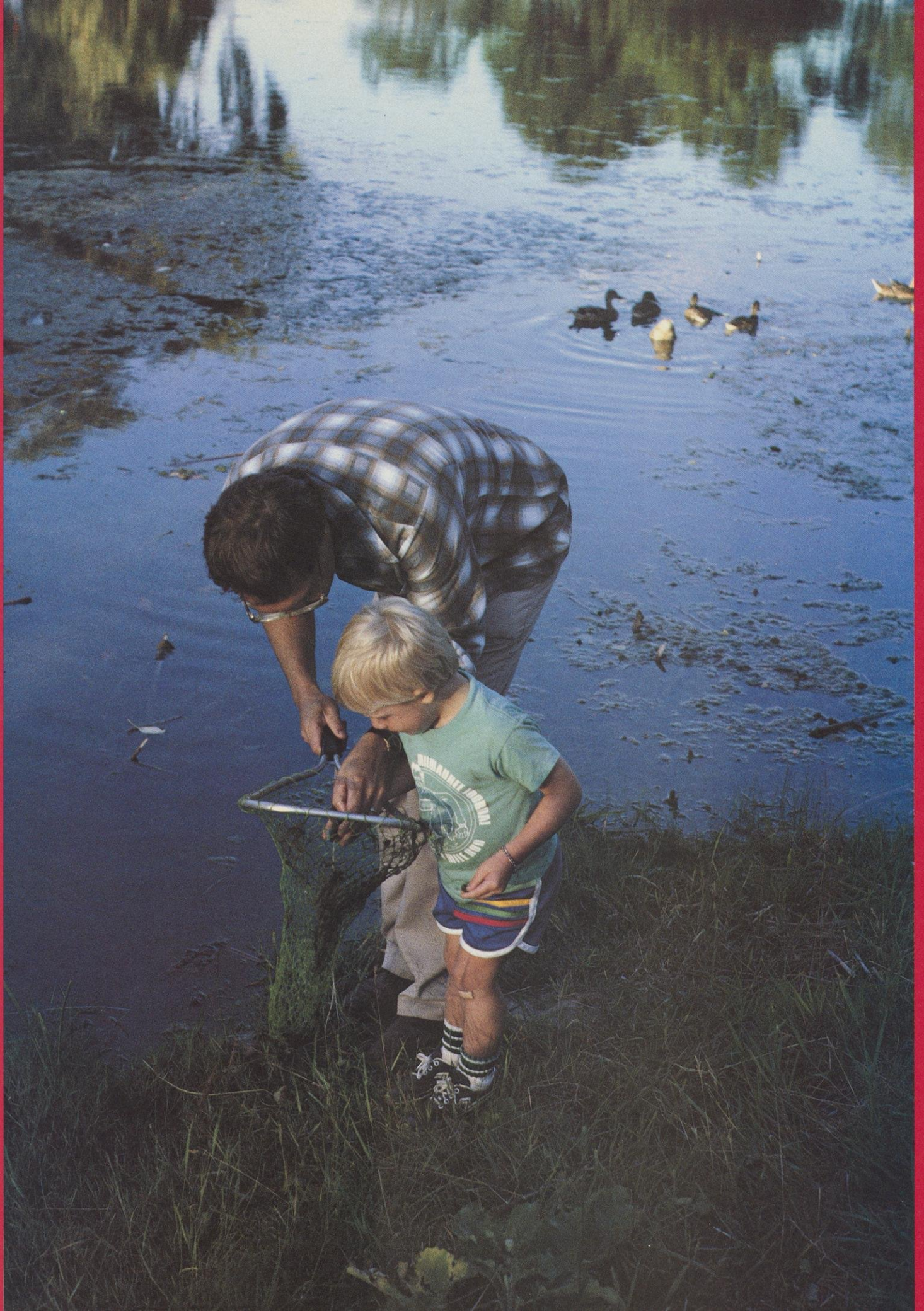
June 6-Many times now they just lay on the bottom, making you wonder if they're alive or dead.

June 7-Night. The black pollies have a bulge just behind the gills which, with the help of the flashlight, is revealed to be the front leg waiting.

June 8-Every night I return here, to the aquarium, to these tiny amphibians. Here the pressure can't intrude. Here is only quiet bubbling and

Jon and I dipped into the pond edge and brought up a strand of eggs intertwined in algae.

Photo by author





Jon is getting the hang of feeding them.

Photo by author

unpresumptuous life. I sit, flashlight in hand, and watch. Two of the tads have front legs.

June 9-Not only are they growing front legs, they're getting skinny.

June 10-Contact with Josh's mom, who tells me that the tadpoles we gave him are all dead. First five died, then that last one. She feels badly but I offer to replenish the stock when the tadpoles are ready to turn into frogs so the kids can see the transition. It takes life to learn about life. The tads seem unhappy about this concept. More flakes!

June 11-The toad tadpoles are now resorbing their tails. I begin to think about the kind of resting place or beach I can make for them. We'll have to drain the tank to half-full when the time comes. But according to Wright and Wright, the husband and wife frog experts, it will be a while.

June 12-Some of the pollies are nearly froglike, with front and back legs and stubby tails. They spend more time in the weeds now, but still breathe with gills.

June 13-The big tadpole doesn't have any legs yet. He's going to wait until ice forms!

June 14-One or two dead tadpoles in the bottom — wonder if the transition is too hard to make. Still have tails on, though.

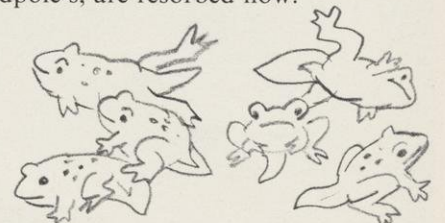
June 15-Disaster! Wrights were wrong, dead wrong. It only took 33 days for them to transform into toads, and most of them drowned last night. Oh no — I forgot — speeding up the metabolism by keeping them in the heated house might knock

weeks off the transition time.

June 16-Upon draining the tank down, I learned also that the toads could walk on land and breathe air, even with long tails. However, the gravel is still filled with living, emerging tad-toads. To the rest, I am sorry; but our pampering has saved some of you, and caused others to die. We have a family discussion about the toad's warts: I learned in Cochran and Goin that the large warts on each side of the shoulder are parotid glands. The rest of the warts are also glands. These glands secrete a whitish fluid which is caustic to animals which try to eat toads. I reassure my wife that neither Jon nor I are in any danger of developing warts. Human warts are caused by a virus.

June 17-The toads have settled down now in shallow water with gravel bars and sand shoals. They refuse to eat tiny pieces of hamburger or brine shrimp even if I try to move them. Fruit flies would be the right size. We must free them.

June 18-All the tails, except of course the leopard frog tadpole's, are resorbed now.





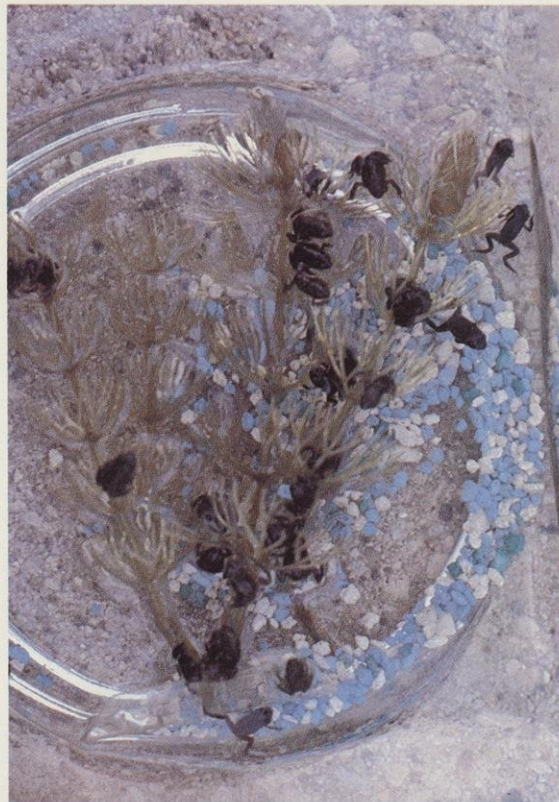
Tomorrow is the day.

June 19-Jon and I caught all the toads easily, because they cling to fingers like sailors to flotsam in open water. Only about 25 are left. I wonder if more would have survived in the wild. Under cover of darkness so no predators could get them, we transport them in their original bowl down to the pond. Bending down, we let some go in the water and they jump quickly from rock to rock. There are mosquitos, gnats and midges here for them. We spread the others in different spots along the bank, some in deep grass, others under brush. So are the seeds scattered, so is the crop sown!

We are happy to see them alive and free, for we feel we have come to know them well. As I take Jon by the hand, I notice he has some warts around his wrist.

Mere coincidence, I croak to myself, and we begin to hop home.

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What kind of frog will it grow up to be?

Photo by Charles Fonaas

Only about 25 are left.

Photo by author

