

A LAKE WINONA COMPENDIUM

INFORMATION CONCERNING THE RECLAMATION
OF AN URBAN WINTER-KILL
LAKE AT WINONA, MINNESOTA

Second Edition

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LAKE WINONA AND ITS ENVIRONS



SUMMARY

Lake Winona, a 319-acre floodplain lake which lies within the City of Winona in southeastern Minnesota, is highly eutrophic because it receives nutrient-rich urban runoff from storm sewers of Winona and Goodview. Severe winter kills in 1965 and 1969 allowed stunted buffalofish (Ictiobus cyprinellus), carp (Cyprinus carpio), bullheads (Ictalurus melas), and gizzard shad (Dorosoma cepedianum) to dominate the lake until 1973, when a reclamation project was initiated to create a productive sport fishery, mainly for children, the elderly and the handicapped. A non-profit corporation, the Lake Winona Committee, has raised funds, installed equipment and coordinated the cooperative efforts of the Minnesota Department of Natural Resources, the City of Winona and Winona State University. Most of the work has been done by volunteers and virtually all equipment has been purchased by local contributors.

Lake Winona was originally a channel of the Mississippi River. Alluvial deltas of tributary streams segmented the ancient channel, isolating the portion which has become Lake Winona. When the first explorers arrived, Lake Winona was a marshy lake, connected to the river at its downstream end during flood time. The raising of Mankato Avenue separated Lake Winona from the river during normal water levels. The lake is now permanently protected from the river by Winona's flood levees. Its level is kept almost constant by pumps which are part of the levee system.

Soil erosion and the flooding of Gilmore Creek have twice filled the lake with sediment, necessitating extensive dredging. Most of the land surrounding the lake has been created from dredge spoil.

The reclamation of 1973 included: 1) installation of aeration systems to prevent winter kills, 2) installation of an electric barrier to prevent rough fish from entering the lake from the river, 3) treatment of the lake and tributary waters with rotenone to kill all fish, 4) cleanup of over 225,000 pounds of dead fish (730 pounds/acre) and 5) restocking with bluegills (Lepomis machrochirus), largemouth bass (Micropterus salmoides), smallmouth bass (Micropterus dolomieu), northern pike (Esox lucius), muskellunge (Esox masquinongy) and walleyes (Stizostedion vitreum).

Fishing was excellent during the first 10 years following restoration, but bluegills and crappies have become stunted, primarily because of: 1) excessive cover provided by lush growth of curlyleaf pondweed (Potamogeton crispus), which proliferated after the rough fish were killed and the lake cleared, 2) insufficient predation, 3) insufficient benthic invertebrates for food due to bottom sediments being anoxic, 4) crowding, and 5) excellent spawning habitat existing along most of the shoreline.

An Altosar weed cutter-harvester was put into service in 1982 and has been used each summer to harvest aquatic plants (primarily curlyleaf pondweed) which have become a nuisance. Northern pike, bowfin (Amia calva) and flathead catfish (Pylodictis olivaris) have been stocked to reduce numbers of bluegills. Fishing for bass and northern pike remains good.

Two fishing piers, constructed by volunteers and financed by contributions, have made the lake accessible to the handicapped. The lake is now encircled by an extensively-used scenic bicycling-jogging path.

The physical and biological condition of the lake has been monitored routinely by Winona State University and the Minnesota Department of Natural Resources. Their data show that aeration is essential to prevent winter-kills and that aeration and weed harvesting are prolonging the useful life of the lake, but that the rate of eutrophication is increasing due to nutrient input. An interceptor sewer line should be constructed to prevent nutrient-charged storm water from entering the lake. The lake is filling rapidly with organic sediments and has accumulated enough nutrients since it was dredged in the early 1950s to last indefinitely. The Lake Winona Committee, the City of Winona and the Winona Port Authority are exploring ways to rejuvenate the lake by dredging and to utilize the dredged spoil to improve park land and to create building sites within Winona's Industrial Park.

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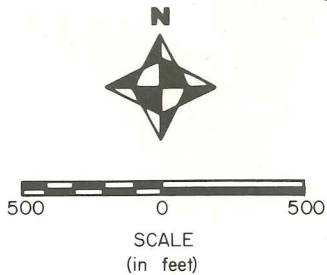
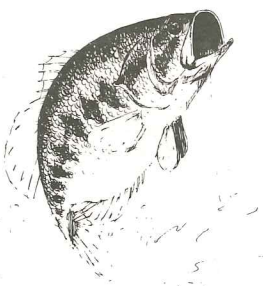
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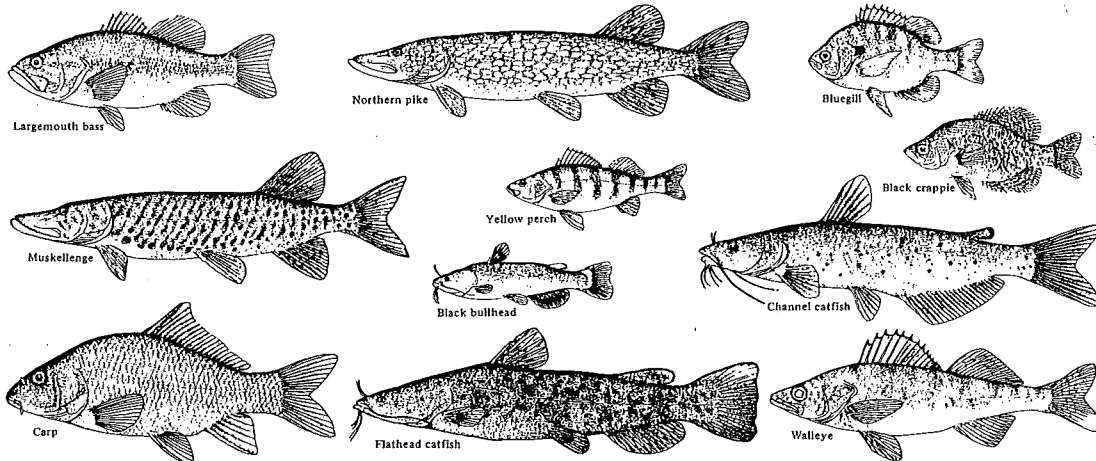
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LAKE WINONA

PRODUCED BY WINONA STATE UNIVERSITY IN COOPERATION WITH THE WINONA AREA CHAMBER OF COMMERCE, THE CITY OF WINONA AND THE LAKE WINONA COMMITTEE.



- KEY-
- BOAT LANDING (RAMP & DOCK)
 - ▲ PARKING
 - PUBLIC RESTROOMS
 - PARKS AND PUBLIC LAND
 - COMPRESSOR UNIT
 - SUBMERGED AIR LINE
 - AERATOR
 - - - BIKE / JOGGING PATH



Drawings from *Northern Fishes* by Samuel Eddy and James C. Underhill, (c)1974, University of Minnesota. Professor Underhill, William D. Schmid, and Gary L. Phillips are the authors of *Fishes of the Minnesota Region*, published by the University of Minnesota Press in 1982.

Caring for your catch

Lake Winona fish are excellent for eating all year round. Complaints of bad tasting fish caught in warm weather are usually due to improper handling of fish after they are caught. Many fishermen place their fish on a stringer by running the stringer into the fish's gill opening and out its mouth. This ruptures delicate blood vessels of the gill filaments, resulting in the death of the fish. Dead fish spoil as rapidly in water as in air of the same temperature, thus a good catch soon becomes inedible. If a fish must be placed on a stringer it should be attached only by the lower jaw so that the gills are not damaged. The best way to ensure the freshness of fish is to put them on ice as soon as they are caught.

Because the gills are ordinarily red with blood, their appearance is a good indicator of freshness. If they are red, the fish is fresh. If they have turned white, however, decomposition has begun. After cleaning and eating their white-gilled catch, fishermen frequently complain that fish caught in the summer are "soft" and do not taste good!

Fishing regulations

Lake Winona is not part of the Minnesota-Wisconsin boundary waters, therefore it is subject to those fishing regulations pertaining to Minnesota's inland waters. Fishermen should obtain complete up-to-date regulations at area tackle shops. The following is a synopsis of those regulations which are especially important to those who fish Lake Winona.

LIMITS: Daily and possession limits are as follows: northern pike - 3, walleye - 6, bass - 6, muskellunge (minimum size 30 inches) - 1, crappie - 15, sunfish - 30, catfish - 5, perch - 100, bullheads - 100.

LICENSES: All residents who have attained the age of 16 and are under the age of 65 must have a Minnesota fishing license on their persons while angling. All nonresidents who have attained the age of 16 must have on their persons a nonresident Minnesota fishing license while angling. A nonresident under the age of 16 does not need a license if his parent or guardian has a nonresident license, but the child's catch must be included in the daily limit of the parent or guardian.

NUMBER OF LINES: Two lines may be used while angling through the ice, but only one line may be used during the icefree season. Tip-ups may be used on fishing lines during the winter, but the owner must be within 80 feet of the lines.

SEASONS: Lake Winona is open continuously for the catching of crappies, sunfish, perch, catfish and bullheads. However, the season closes on February 15, for walleyes, northern pike, bass and muskellunge. The season usually reopens for walleyes and northern pike on the Saturday nearest May 15. The bass season usually reopens on the Saturday nearest May 30. The muskellunge season usually reopens on the Saturday nearest June 5. Consult official Minnesota Department of Natural Resources regulations each year to confirm opening and closing dates.

WATERCRAFT: All watercraft must display current registration, and all occupants must have readily available a U. S. Coast Guard approved flotation device. City ordinance prohibits use of

outboard motors larger than 10 h.p.

FISH HOUSES: All fish houses must have the owner's name and address printed legibly on the outside with letters and figures at least three inches in height. All fish houses must be licensed. The metal tag furnished with the license must be attached to the door, no more than six inches from the top. Doors must be designed so that they may be opened from the outside at any time. All fish houses (including all parts thereof) must be removed from the ice by March 1. Littering is illegal.

Biological Information

Lake Winona is a very fertile (eutrophic) lake with a probable carrying capacity of over 300 pounds of game fish per acre. Because the lake is circulated by aeration systems during the entire year, fish may be found at all depths. The lake furnishes ample spawning habitat for sunfish, bass, crappie and bullhead. Boller Lake, which provides excellent spawning habitat for northern pike, is managed as a rearing area for Lake Winona. Walleyes, which need water-washed gravel for spawning, do not reproduce well in the lake. Because it is inevitable that rough fish such as carp and buffalo will occur in any lake so near the river, it is essential to: (1) prevent winter kills (which favor rough fish), (2) control rough fish (by netting and by preventing them from spawning), and (3) maintain predator populations at high levels so they will prey upon small rough fish.

Storm sewers supply Lake Winona with lawn fertilizers, tree leaves, grass clippings and other nutrients. These nutrients cause lush growths of curly leaf pond weeds which cause problems for swimmers, boaters and fishermen. The plants also provide so much cover for the sunfish and crappies that predators like northern pike cannot eat enough of them. Consequently, the sunfish and crappies tend to overpopulate and to become stunted. Fishermen can help prevent stunting of sunfish and crappies by catching more of them and by taking them all home. It would be extremely difficult to over-fish Lake Winona. Future plans for the lake include a weed harvester.

Lake Winona history

Lake Winona was a marshy, abandoned river channel when the first white settlers arrived in 1851. By 1860, intensive wheat farming had begun in the watershed, and it caused severe soil erosion problems. Gilmore Creek was diverted into Lake Winona in 1885 in an effort to prevent chronic winter kills of fish by supplying fresh water. However, Gilmore Creek quickly filled the lake with eroded agricultural soil and the lake was dredged for the first time in 1916. The dredged soil was used to construct park land and the Huff Street causeway. Because Gilmore Creek continued to cause frequent floods in the west end of Winona, the creek was re-routed in 1944 through Boller Lake so that Boller Lake would act as a flood reservoir and as a settling basin for eroded soil. During the preceding 28 years, however, Lake Winona had once more filled with soil and it was dredged again during the 1950-1953 period at a cost of \$485,000. Some of the dredged material

was used to create the land on which the hospital and high school were later built.

A major fish kill occurred during late winter of 1965 because of oxygen depletion. Most game fish were killed and the lake quickly became dominated by the hardier buffalo, carp and bullheads that survived the kill. Game fish were reintroduced, but they became stunted because they had to compete with rough fish for space and food. A second winter kill occurred in 1969, compounding the rough fish problem. The rough fish became so abundant that they destroyed most weed beds and caused the lake to be constantly muddy. It was apparent that winter kills would occur with increasing frequency because Lake Winona was suffering from eutrophication (enrichment due to excess fertilization).

The Lake Winona Committee organized as a non-profit corporation in 1973 to initiate a lake reclamation program in cooperation with the City of Winona, the Minnesota Department of Natural Resources and Winona State University. The main goal of the reclamation program was to provide safe, quality fishing - especially for children, the elderly and the disabled. Winona and area citizens contributed over \$22,000 to pay for an aeration system and an electrical fish barrier; and the City of Winona agreed to operate and maintain them. The Minnesota Department of Natural Resources, with the aid of many volunteers, killed all fish in Lake Winona and Boller Lake with a biodegradable chemical called rotenone in September, 1973. Volunteers cleaned up over 250,000 pounds of dead fish, most of which were stunted buffalo, carp and gizzard shad. The lake was then restocked with northern pike, largemouth bass, smallmouth bass, bluegill, walleye, channel catfish and muskellunge. Total DNR costs were about \$23,000 - all monies derived from fishing license fees and taxes on fishing equipment. In total, the Lake Winona project has been the most complex lake restoration project ever undertaken in Minnesota. Biologists at Winona State University, in cooperation with the Minnesota DNR, maintain regular biological and chemical surveillance of the lake. They are assisted in this work by St. Mary's College biologists and by students from Winona Senior High School.

The Lake Winona Committee is composed of volunteers from many walks of life, and it always welcomes new members. The Committee serves as a catalyst for new lake projects (e.g. bicycle paths, fishing piers) and its members contribute their time to rear northern pike, to construct fishing piers, to control rough fish, and to raise money for new projects.

