An Appraisal of The Need for Purchase of a Stern-Trawling Fishing Vessel for Rough Fish Control on Lake Winnebago
INTRODUCTION

During the period from 1955 through 1966, an experimental intensive rough fish removal program was conducted on Lake Winnebago to evaluate the effect of removal on both rough and game fishes. While a number of rough fish species were removed, the effort made by state and contract fishing crews was primarily directed at the sheepshead, or freshwater drum, the most abundant species. A total of 35,549,099 pounds of rough fish were removed during the 12-year interval of which 33.4 million pounds were freshwater drum.

The program was thoroughly studied and reported in 1971 by research fishery biologist Gordon R. Friegel in Wisconsin Department of Natural Resources Technical Bulletin Number 47 entitled "Evaluation of Intensive Freshwater Drum Removal in Lake Winnebago, Wisconsin, 1955-1966."

Rough fish removal is a basic tool used by fish managers nation-wide and has resulted in increases in an abundance of game fish and improved sport fishing. At the same time, the catch may be utilized and processed for human and animal consumption. While the sheepshead is not highly rated as a food fish in Wisconsin, many hundreds of thousands of pounds are sold annually in and outside of Wisconsin for human use. With the anticipated increased demand for protein in the form of rough fish resulting from a shortage of ocean fishes, an increased removal effort by the Calumet Harbor crew with more efficient, newly perfected equipment is suggested.

Lake Winnebago

Lake Winnebago is the largest body of water in the state, covering 137,708 acres or 215 square miles with a maximum depth of 21 feet. It is 28.0 miles long in a north-south direction and 10.5 miles wide from east to west. The lake is bounded by 4 counties: Winnebago, Fond du Lac, Calumet and Outagamie. It is heavily favored by sportsmen, winter or summer. As many as 5,000 cars of fishermen may utilize the lake daily during the period when the lake is frozen, and hundreds of boats are used similarly to fish during open water conditions.
It is fed by both the fertile Fox and Wolf Rivers which directly connect Lake Winnebago to Lakes Poygan (10,992 acres), Winneconne (4,507 acres) and Big Butte des Morts (8,857 acres). Thus, a total of 162,064 acres of recreational waters are included within the Winnebago chain of lakes.

State and Contract Rough Fish Crews

During the 12 year intensive removal effort on Lake Winnebago, the Calumet Harbor state rough fish crew and as many as 5 contract crews assisted in the program. Maximum removal was 4.3 million pounds during 1957, and the minimum 1.5 million pounds in 1966 within the 12-year study period. Since the intensive effort concluded in 1966, only the Calumet Harbor state crew has been in continuous operation. During 1972 and 1973, one large commercial trawler has assisted for a one month period of time annually.

Gear Used in Intensive and Current Removal Efforts

A secondary study during intensive rough fish removal efforts on Lake Winnebago was to determine the most efficient equipment.

At first, hoop nets (capable of holding up to 2,400 pounds of freshwater drum) and trap nets (which could hold 8,000-10,000 pounds) were used under the ice and in open water conditions. The advantages of trap nets soon became apparent and the use of hoop nets discontinued.

Trawls ("V" shaped nets pulled along bottom by large boats called trawlers) are commonly used to catch salt-water fishes, and were used experimentally on Lake Winnebago only by the Calumet Harbor state rough fish crew from 1957-1960.

When it was determined that trawling was an efficient method of harvesting freshwater drum without deleterious effects on the game fish population, contract rough fish crews were permitted to trawl.
The most efficient methods of rough fish removal on Lake Winnebago have now evolved to trap netting under the ice and in open water until June 30. After July 1 when water conditions are more turbid and freshwater drum often concentrated, trawls are used.

The Calumet Harbor state rough fish crew uses two relatively small boats which were designed for setting and lifting trap nets, and later modified for pulling small trawls.

The boats are: (1) The Sheepshead, a 36 foot steel launch with a 12.6 foot beam, originally purchased in 1955 for $6,875, equipped with a gasoline engine. In 1962 it was equipped with a more powerful and efficient, and less hazardous 125 Hp diesel engine, and (2): The Winnebago, a 40 foot steel boat with a 12 foot beam purchased in 1957 for $7,900. It was converted to 125 Hp diesel power in 1961.

Both the Sheepshead and Winnebago are side trawlers. After the net is pulled through the water, it is raised on to the boat over one side. Because of the narrow beam of both vessels, they are forced to find shelter in harbor during windy, rough weather. Despite the limitations imposed on the Calumet Harbor crew by the size of their ships and the difficulty in raising the net over the side in rough weather, more efficient techniques have enabled the crew to gradually increase their catch an all-time high of 1.33 million pounds of sheepshead during 1973. Since completion of the 12-year intensive fishing program, they have averaged catching 1.11 million pounds of freshwater drum annually.

More efficient methods of harvesting rough fish by trawling have evolved since the two Calumet Harbor boats were purchased.

During both 1972 and 1973, a large commercial contract trawler was brought to Lake Winnebago to fish for a one-month period. During 1972, 417,625 pounds and in 1973, 506,450 pounds of drum were caught.
The commercial trawler used was 52 feet long with an approximate 17 foot beam. The more powerful diesel motor enables a larger net to be employed, and the net is brought into the boat with a hydraulic lifting mechanism over the stern. The larger length and wider beam, plus the stern net-lifting capacity enabled the more stable boat to head into the wind and continue operating in a heavy sea while the smaller state boats were forced to head for shore. The larger and deeper trawl nets used by the commercial trawler also captured more drum per haul.

**Effects of Intensive Removal on Freshwater Drum Populations**

Accepted statistical analysis methods indicate that the ages of individuals within a fish population have long been regarded as an indication of a decrease in numbers as long as the rate of growth remains the same.

In his evaluation of the effects of intensive removal, Priegel (1971) showed that at the start in 1955, 55 per cent of drum sampled were of age groups VI and VII. By 1960, age groups V and VI were the major support of the fishery comprising 60 per cent of the sample. In 1963, age group IV accounted for 55 per cent, and by 1965, very small fish in age groups I and II comprised 60 per cent of the catch, indicating a heavy harvest of the drum population in the lake.

The small average size of the drum at this time discouraged private contractors, and they ceased operations on the lake until 1972 and 1973 when larger fish were again present in harvestable quantities. During 1973, the catch was predominated by age class III and IV fish which constituted 67 per cent of the total. Another 32 per cent of the fish were of age classes VI to VIII, as reported by Lake Winnebago Research Biologist John Weber.

In his discussion on management implications of intensive freshwater drum removal, Priegel (1971) recommends that "The future should call for maximum harvest of the freshwater drum. Without this, all efforts over the last 12 years
(1955-1966) to reduce the freshwater drum population to as low a level as possible will be wasted. Since the freshwater drum is a very prolific fish and occupies a favorable habitat, the population would soon consist of many slow-growing, old-age fish, which was the situation before the program began in 1955. To keep the population at an optimum size in Lake Winnebago, approximately 2.5 to 3.0 million pounds should be removed annually."

**Effects of Freshwater Drum Population on Game Fish Species**

An acre of water is capable of supporting a given number of pounds of fish per acre of water, dependent generally on water fertility, water hardness and the degree of alkalinity or acidity. If, for example, the freshwater drum population increased by a certain percentage of the total poundage per acre, the game fish population must decline by a similar percentage.

Theoretically then, a decline in the pounds per acre of drum should increase the numbers (or pounds) of more desirable game fish species.

Priegel showed that certain species were particularly opportunistic when freshwater drum were removed from Lake Winnebago.

Using the average number of each species caught in trap net lifts during the period 1955-1966, it was shown that white bass, for example, were taken at a rate of 21 per net lift in 1955. By 1961 they reached the highest average of 407 per lift, declined to 103 per lift in 1964 and reached 252 per lift at the conclusion of the study in 1966.

Walleyes caught per lift in 1955 averaged 8, increased to 12 in both 1960 and 1961, dropped to a low of 4 in 1962 and increased to 12 in 1966.

Sauger had reached their lowest population in 1955 when the catch averaged 4 per net lift. By 1960 it had increased to 30, dropped to 6 in 1962, reached a maximum of 44 in 1964 and terminated at 8 in 1966.
Black crappie responded very slowly to drum removal, averaging 1 per lift in 1955, dropping to 0.5 during 1957-1959, with a rapid increase to 45 per lift in 1961, and terminating in 1966 with 14 per lift.

Similarly, yellow perch averaged only 0.8 per lift in 1955, reached a maximum of 17 in 1963 and dropped to 2 per lift at the end of the study.

Each of the five major species showed significant increases even though continuous efforts were made to develop methods to reduce the take and handling of game fish species, especially walleyes, sauger and perch. Priegel (1971) concludes that commercial fishing on Lake Winnebago resulted in a decline of freshwater drum while game and panfish species showed a definite increase in abundance.

When freshwater drum produce explosive hatches in Lake Winnebago and connecting waters, young-of-the-year of the species become so abundant that they produce a profound effect on sport fishing particularly when other food fishes are low in abundance. Then, young drum are a favorite food fish of the walleye and sauger for a 6-9 month period (dependent on their date of hatching). Because of their peculiar, deep bodied, hump-backed body configuration, they cease to be a food item to game fishes after they reach approximately 4-5 inches.

The winter of 1973-1974 produced exceptionally poor angling success on Lake Winnebago. Directly attributable was an abundant late summer 1973 freshwater drum hatch, in excess of 400 per cent higher than 1972 reproduction, while hatches of other food species declined. Additionally, the large 1973 year class is expected to significantly expand the drum population in the Winnebago Chain.

State Rough Fish Crews Versus Commercial Contract Fishermen

During intensive removal efforts from 1955-1966, as many as 5 commercial contract fishermen operated on Lake Winnebago. However, as soon as the "cream" of the crop was harvested, they diverted their efforts to other species more financially suitable, or the crews were disbanded and are no longer fishing.
With modern technology and equipment, it is now entirely possible for one state rough fish crew at Calumet Harbor to annually harvest the recommended 2.5 to 3.0 million pounds of freshwater drum from Lake Winnebago.

Future plans call for the use of sonic tags and side-scan sonar to locate concentrations of drum under the ice and in open water. Night trawling, trawls utilizing electricity and mid-water trawls will be used experimentally to determine more efficient methods. The use of purse seines to encircle schools of drum in mid-lake will be investigated.

**Proposed Purchase of Trawler**

To enable the Calumet Harbor crew to expand their production in order to move toward removal of the recommended 2.5 to 3.0 million pounds of drum annually, it was then proposed to purchase a large, stern trawler.

Contacts of commercial fishermen along the Great Lakes showed that only one, used, fully equipped commercial 55 foot trawler was for sale at a price of $50,000. The boat is 33 years old, with a 4 year old diesel motor. All major equipment, including net reels, winches and conveyors are operated by independent gasoline engines.

Two shipyards were contacted to determine the cost and time required to build a new trawler. The preliminary proposal at one shipyard was $106,000 with June, 1975 delivery.

The second proposal, from the T. D. Vinette Company, Marine Division, Escanaba, Michigan, to supply a new 52'10" long trawler with a 16'1" beam for June, 1975 delivery at a cost of $55,936 is recommended for consideration.

The boat would utilize a 250 Hp diesel motor, with all major equipment operated hydraulically. As an example of one netting operation, the hydraulic winch would pay out the trawl net and attached lines away from the boat, and hold the equipment being pulled through the water. The full net would then be hydraulically winched back to the boat where a hydraulic ramp would lower, accept
the net and lift the net of fish into the boat. A hydraulic net reel would pull the net over a hydraulically lifted roller to spill the fish on a sorting table where game fish could be rapidly returned to the water. Rough fishes would then be moved to a large bin at the bow of the boat by a hydraulic auger conveyor.

It is estimated that the Vinette trawler will be capable of safely transporting up to 25,000 pounds of fish compared to 14,000 - 17,000 pounds for the two ships presently in use. In addition, the Vinette trawler will catch the fish more rapidly, allowing additional on-shore time to unload and ship the catch.

With the new trawler operating from the Calumet Harbor base, it is estimated that initially 500,000 to 750,000 additional pounds of drum can be harvested annually. In addition to the potential additional game fishery the removal would stimulate, the sale of the additional fish at 1973 average prices of .0465 cents per pound would produce an additional $23,250 to $34,875 revenue annually. By deducting operating costs of 50 per cent each year, the cost of the trawler could possibly be amortized in 3-5 years.

With familiarization of the capabilities of the trawler, new and improved methods of removal could be attempted. The Vinette trawler offers the Calumet Harbor crew, for the first time, equipment capable of handling modern techniques and refinements into the foreseeable future.

At the January 18, 1974, meeting of the Board of Natural Resources, an anonymous gift of $7,500 was acknowledged to be used for the improvement of fisheries trawling equipment on Lake Winnebago. The actual cost of the proposed trawler to the Department of Natural Resources would thus be $48,436.

Blueprints, specifications and a contract proposal are attached.