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## Summary of 23 Consecutive Years of Creel Census on West Okoboji

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## Summary of 23 Consecutive Years of Creel Census on West Okoboji

TERRY JENNINGS<sup>1</sup>

*Abstract.* A creel census has been used on West Okoboji Lake annually since 1946. Two creel census methods have been used. Each method and the results obtained are discussed.

Fish harvest, harvest rate and angler use has fluctuated between wide limits. For an average year yellow perch, black bullhead, and bluegill are usually the most abundant species captured. The mean harvest rate for 23 years is 1.58 fish per hour.

A creel census has been made on Lake West Okoboji annually since 1946. These investigations have been made primarily to assess fish harvest, harvest rates, and angler use.

Lake West Okoboji contains 3,788 surface acres. A maximum depth of about 132 feet makes it Iowa's deepest natural lake. It is located in northwest Iowa and lies in a drainage basin containing five additional Iowa lakes and several in southern Minnesota. Except during periods of very low water levels, it is connected with other lakes of the drainage basin by a narrow waterway. The basin was originally formed by glacial drifting. It is eutrophic and contains a stable population of fish.

Catch and angler use statistics have been collected by two different methods. The first was based upon a simple fisherman interview, and was used until 1957. During the first 7 years of study, boat liverymen interviewed fishermen using their facilities. The information was collected and assembled by the State Conservation Commission. Boat liverymen were dropped as interviewers in 1953. Since then all creel censusing has been accomplished by State Conservation Commission personnel.

The second creel census method, a comprehensive type<sup>2</sup> by which estimates are made of total fish harvest and angler use, has been used since 1957. During 1960 a contact-type census was conducted from May through November and a comprehensive type census was used from December through February.

A variety of creel census periods have been used throughout the years. During 1946 and 1948 censusing extended from May through August. In 1947 May through October was checked. May and June were censused in 1949. During 1950, 1951, and 1952 census periods were May and June, then December through February. Since 1953 creel census has been conducted from May through February.

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<sup>2</sup> Rose, Earl T. 1956. The quantitative creel census methods at Spirit Lake, Iowa State Conserv. Comm. Quart. Biol. Rep. 8(2):21-30.

FISH HARVEST

Harvest of fish by anglers has ranged between relatively wide limits (Fig. 1). In the contact type census total catch ranged from 13,747 in 1950 to 57,719 in 1953. In the comprehensive census an-

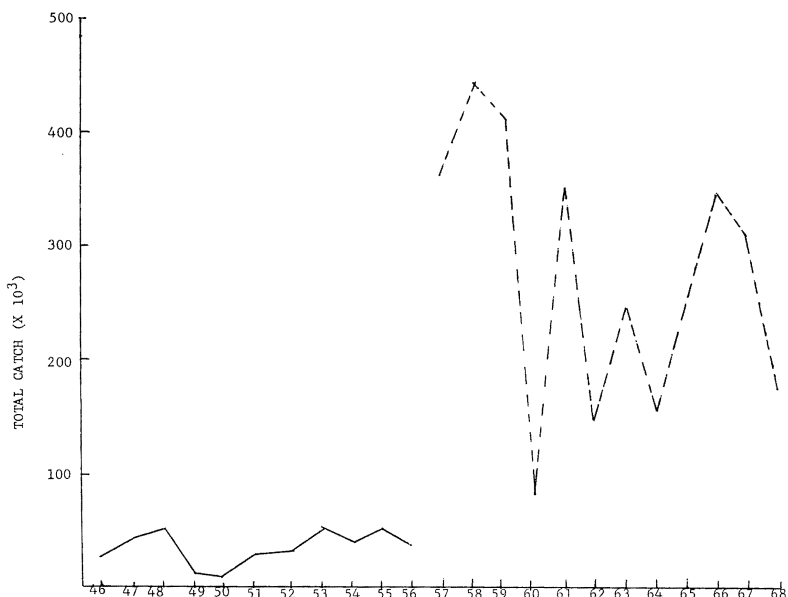


Figure 1. Angler harvest in West Okoboji, 1946 through 1968. (Solid line represents contact census; broken line represents comprehensive census.)

gler harvest ranged from 86,024 fish in 1960 to 443,113 fish in 1958. Since 1953 modes in total catch have occurred at 2 and 3-year intervals.

Yellow perch (*Perca flavescens*) has dominated the catch in 20 of the last 23 years. This species has annually comprised between 26% and 79% of the total fish harvest. The perch harvest was proportionally greater in the comprehensive census averaging 56%, whereas in the contact census they averaged 48%. Much of this difference is the result of increased censusing during the fall and winter months. Yellow perch harvest is much greater during these periods than during the spring or summer months. Modes in the yellow perch catch have occurred at 2 and 4-year intervals. Generally, modes in perch harvest correspond with modes in total catch.

Black bullhead (*Ictalurus melas*) generally ranked second in abundance. They comprise between 5% and 44% of the total annual catch. Proportionally, the bullhead catch was greater during the comprehensive censusing, averaging 21% whereas in the contact census they averaged 17%. Much of the difference is the result

of exceedingly large catches of bullhead during 1957, 1958, and 1959 when they comprised 34%, 40%, and 44% of the total harvest respectively. Bullhead harvest modes have occurred at 2 to 6-year intervals.

Bluegill (*Lepomis macrochirus*) usually ranked third in creel abundance. For individual years they have comprised between 4% and 21% of the total harvest. In the contact census the mean was 7% and in the comprehensive census they averaged 16% of the total catch. Bluegill harvest is not as closely related to the time of year as is the harvest of perch or bullhead. Observed difference is simply the result of more bluegill being observed in the creel. Modes in bluegill catch have occurred at 5-year intervals.

Black crappie (*Pomoxis nigromaculatus*), northern pike (*Esox lucius*), walleye (*Stizostedion v. vitreum*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), white bass (*Roccus chrysops*), channel catfish (*Ictalurus punctatus*), freshwater drum (*Aplodinotus grunniens*), pumpkinseed (*Lepomis gibbosus*), bigmouth buffalo (*Ictiobus cyprinellus*), and carp (*Cyprinus carpio*) have also been captured in West Okoboji, but none have consistently comprised more than 3% of the total harvest.

In the comprehensive census, total estimated weight of the fish harvest ranged from 21 lbs. per acre to 66 lbs. per acre, with a mean of 38.5 lbs. per acre. The year 1960 has been excluded from the above statement because that year only the winter months were censused using comprehensive methods.

#### HARVEST RATE

During the past 23 years the mean annual harvest rate has ranged from 0.82 fish per hour to 2.47 fish per hour and has averaged 1.58 fish per hour (Fig. 2). In the contact census the average annual catch rate ranged between 0.82 in 1951 and 1.39 in 1947, with an average of 1.10 fish per hour. Mean harvest rates in the comprehensive census ranged from 1.06 in 1957 to 2.73 in 1961 and averaged 1.89 fish per hour. Much of the difference in harvest rate can be attributed to the variety of census periods during the contact census. In general, rate of harvest parallels the yellow perch catch.

#### ANGLER USE

Angler use has also fluctuated between wide limits (Fig. 3). For the contact census, angler interviews ranged between 5,165 in 1950 and 22,541 in 1953. In the comprehensive census estimated angler trips ranged from 14,336 in 1960 to 109,642 in 1958. Based on rec-

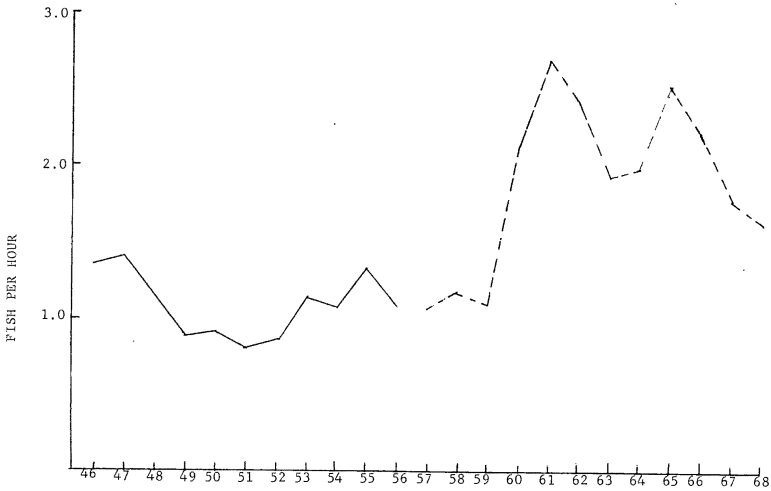


Figure 2. Angler catch success in West Okoboji, 1946 through 1968. (Solid line represents contact census; broken line represents comprehensive census.)

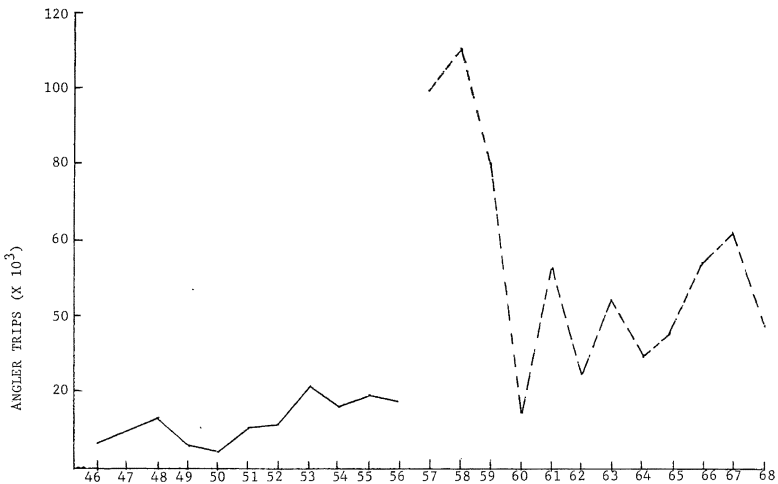


Figure 3. Angler use of West Okoboji, 1946 through 1968. (Solid line represents contact census; broken line represents comprehensive census.)

ordered interviews, there was an abundance of anglers utilizing West Okoboji's fishery resource during the contact census. Heavy angler use was observed in the comprehensive census until 1959 after which fishing pressure decreased.

In the contact census the average fishing trip lasted 2.74 hours.

In the comprehensive census the average fishing trip lasted 3.04 hours. At the 0.05 level of probability the two means are not significantly different ( $t=0.8445$ ;  $t_{0.05}=2.081$ , 21 df).

#### DISCUSSION

Two creel census methods have been used for data collection. These two methods included a simple fisherman interview census, which was used from 1946 to 1956, and a comprehensive census, which was used from 1957 to 1968. During the time of use of both creel census methods fish harvest, harvest rate, and angler use fluctuated between wide limits. Generally, modes in fish harvest correspond with modes in angler use. By Spearman's rank correlation the relationship is highly significant ( $r_s = 0.927$ ;  $P < 0.01$ ). Catch success is correlated with fish harvest ( $r_s = 0.517$ ;  $P < 0.05$ ), but not correlated with angler use ( $r_s = 0.406$ ;  $P > 0.05$ ).

Yellow perch, black bullhead, and bluegill are usually the most abundant species captured. Modes in perch harvest have occurred at 2 and 4-year intervals while bullhead harvest modes have occurred at 2 and 6-year intervals and bluegill harvest modes occurred at 5-year intervals.

Angler use was heavy during the first 3 years of comprehensive census. A decline in fishing pressure occurred during the last eight years of comprehensive census. Much of this decline can be explained by an increased number of public fishing areas in Iowa in recent years.