

# **The Bait Minnow Industry of the Great Lakes**

**UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF COMMERCIAL FISHERIES**

**Fishery Leaflet 608**

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By

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# The Bait Minnow Industry of the Great Lakes

By

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## ABSTRACT

The bait minnow industry is described, and methods for increasing the harvest are demonstrated by the results of exploratory bait fishing activities completed by the Bureau of Commercial Fisheries.

## INTRODUCTION

The bait minnow industry, mainly confined to central and western Lake Erie and the shallow bays and inlets of the other Great Lakes, evolved over the years to meet the bait requirements of a rapidly expanding sport fishery. Because of the lack of a system for reporting the catch, the extent and value of the fishery is unknown; however, the value derived from the sale of bait minnows must be considerable because tremendous numbers of sport fishermen use minnows for bait.

A major problem of the bait industry is that it can't catch enough minnows during the summer when the sport fishery reaches its peak. Harvesting methods now used depend on the seasonal occurrence of minnows in shallow water.

The future growth and prosperity of the bait business along the Great Lakes depend on whether the industry adopts new or improved techniques to harvest the available minnow stocks. Research by the Bureau of Commercial Fisheries reveals that this change is possible with minimum additional expenditures on vessels and gear.

This leaflet answers questions about how to catch bait minnows in the Great Lakes. It also reports on pertinent research by the Bureau of Commercial Fisheries.

## BAIT MINNOWS

Bait minnows belong to the family Cyprinidae, which is represented by almost 200 fresh-water species in North America. Only two species in the Great Lakes, the emerald shiner (*Notropis atherinoides*) and the spottail shiner

(*Notropis hudsonius*), are considered suitable for bait and occur in sufficient abundance to support the industry (fig. 1).

## Emerald Shiner

The method of fishing for emerald shiners, the more desirable minnow, is dependent on the seasonal movements of this species. The adult fish move inshore during early spring and school over clean sand and hard mud bottom where they spawn from late May to early July. The eggs hatch quickly, and the young remain inshore in small dense schools until midsummer when they move offshore. The fish is typically an open water fish and during most of the summer remains offshore, dispersed throughout the surface waters of the lakes. In late spring or early summer and again during the late fall and early winter, the adult and young fish are harvested in quantities to meet the needs of the sport fishery and to stock storage ponds and tanks for sale when they are not found in shoal water.

## Spottail Shiner

The spottail shiner, like the emerald shiner, is found in abundance in shallow water during June when it spawns over clean sand or gravel shoals. The young and adults, however, spend a shorter period in shallow water than does the emerald shiner; therefore, the spottail shiner contributes to the bait fishery only for a short time. Once this fish migrates offshore, it does not remain pelagic but associates closely with the bottom until late fall when it moves into shoal water and again is caught in large quantities by some bait dealers.

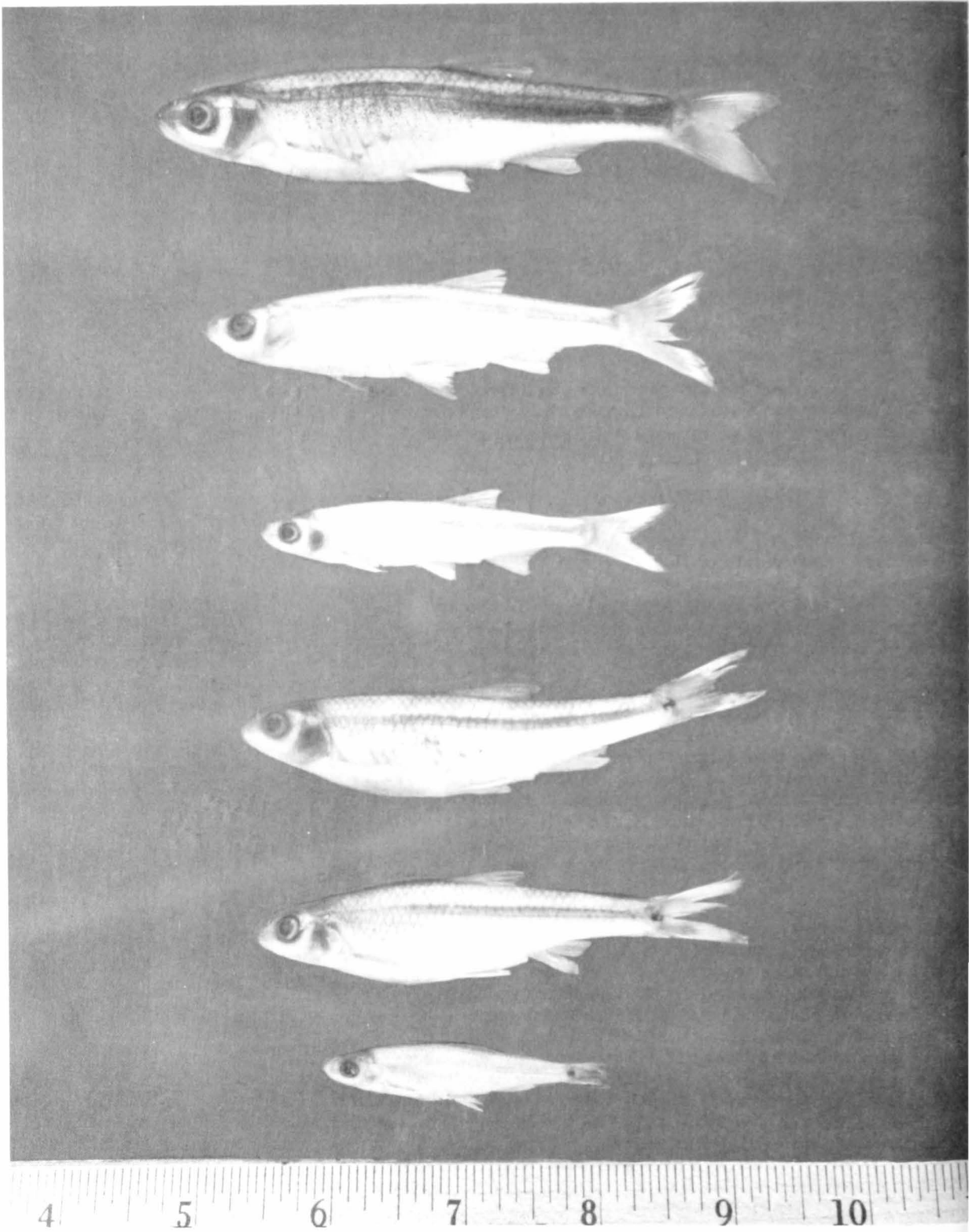


Figure 1.--Bait minnows of the Great Lakes. Upper three--Emerald shiners (Notropis atherinoides), lower three--Spottail shiner (Notropis hudsonius).

## FISHING EQUIPMENT

### Vessels and Equipment

Various sizes and types of craft are used in the bait minnow industry. Boats may range from 12-foot skiffs powered by outboard engines to 40-foot vessels powered by inboard gasoline or diesel engines. A typical vessel is about 28 feet long overall, has a shallow draft, and is made of wood or steel (fig. 2). Except for a small cabin forward, the deck is an open work area with a large live tank amidships and a bin on the stern to hold float racks with the attracting lights. A mechanically driven gypsyhead and often a small davit are forward near the cabin on the portside. The davit is used to support the large lift net. The larger vessels are generally manned by two to three men.

The live tank is an important feature of the bait boat, for the fish are sold alive to the fishermen. A centrifugal pump with a capacity of 10 to 40 gallons per minute is installed aboard some vessels. The pump may be used to pump the bilge as well as supply fresh lake water to the live tanks. On other vessels, a portable pump is used exclusively to supply the live tank with fresh lake water. In either system, the water in the live tank is constantly replaced by the fresh water, which is sprayed into the tank through perforated plastic or steel tubing. Some fishermen prefer to maintain suitable concentrations of dissolved oxygen in the live tank water either by agitating the water with commercial mechanical devices or by bubbling compressed air or commercial oxygen through the waters.



Figure 2.--A typical vessel used in the bait minnow industry. Note the vessel has live tanks for storing the catch and a davit for handling the lift net.

### Fishing Gear

The haul (beach) seine, lift net, toss seine, and small dip net are now used in the bait minnow industry along the Great Lakes. The type of gear in use at any particular time depends on the availability and distribution of the minnow stocks and the personal preference of the fisherman.

**Haul seines.**--Seines, ranging from 25 to 100 feet long by 4 to 8 feet deep, are constructed of 1/2-inch (stretched) woven or knotted nylon webbing hung to equal lengths of 3/8-inch rope, which serve as corkline and leadline (fig. 3). Hardwood or aluminum brails, 6 to 8 feet long, are attached at each end. Two or three men haul the seine along the beach, and the catch is transferred by "live" buckets (special type of double bucket) to tanks or trucks parked nearby.

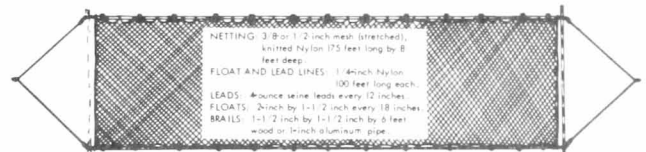


Figure 3.--Construction details of a haul seine.

**Lift nets.**--These nets consist of 1/2-inch (stretched) woven or knotted nylon webbing hung loosely on a 4- to 6-foot square or round metal frame to form a large bag (fig. 4). The frame is attached to a long pole by a rope bridle when the lift net is operated from a dock or pier. The long pole is not used when the lift net is operated from a vessel with a davit. This net and pole serve as a large dip net to catch fish after they have been concentrated by an attracting light.

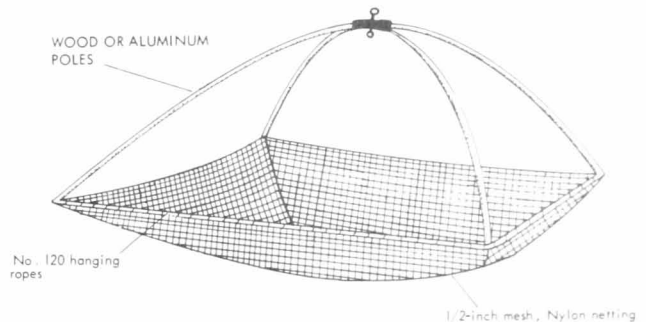


Figure 4.--Construction details of a lift net.

**Toss seines.**--Small seines, 8 to 12 feet long by 3 to 5 feet deep, are thrown and then retrieved by two men. These nets, generally constructed of woven 1/2-inch (stretched) nylon netting, have short brails and 20- to 30-foot-long hauling lines (fig. 5). One end of the line is



Figure 5.--A toss seine fitted with hauling lines.

attached to the brail, and the other has a loop through which the fisherman inserts his hand to prevent the loss of the seine while fishing.

Dip nets.--These nets have 12- to 18-inch diameter hoops from which is suspended a bag of netting of 3/8-inch (stretched) mesh. The handle is 6 to 8 feet long. The nets are used to dip the minnows from the larger nets into storage containers or to transfer fish from tank to tank.

Attracting lights.--These lights are gasoline lanterns mounted on wooden platforms which are fastened to inner tubes for floatation. These tubes are then anchored in place by rope and chain or concrete blocks.

### FISHING THE NETS

During a typical night, 4 to 10 attracting lights are anchored at offshore positions about one-quarter-mile apart. By the time the last light has been set, the first light has usually attracted enough minnows into the area for effective fishing. The vessel approaches the attracting lantern at low speed, and the fishermen retrieve the float and lantern. At the same time, a 6- to 12-volt direct current light of low intensity is turned on to reduce the scaring effect created by the lift net or toss seine and to keep the minnows concentrated. The fishermen successively raise and lower the lift net among the concentrated minnows and collect as many fish as possible before moving on and repeating the procedure at the next light.

Some fishermen prefer the toss seine. This net is repeatedly thrown outward from the vessel and slowly retrieved. The catch is transferred from the seine to the live tank by long-handled dip nets, or the entire seine may be lifted and the fish dumped into the tank. Frequently predator fish are taken, and they must be removed before the catch is placed in the tank.

Catches of minnows vary substantially depending on a number of factors. At times more minnows are attracted to the lights than can be held in the live tank, and some lights are retrieved without any fishing attempt. At other times night fishing is unsuccessful owing

to a bright moon, which prevents the light from attracting minnows, or bad weather. Bait suppliers then must look elsewhere for a source of supply.

In some localities the fishing is near shore installations, and then the minnows are transported directly to live tanks on trucks. The transportation has to be careful to ensure minimum loss of fish through oxygen depletion or contaminated water. This is generally accomplished by agitating the water with mechanical devices or by releasing compressed air or oxygen into the water.

### BUREAU FISHING GEAR TRIALS

By 1958 the decline in abundance of more valuable food fishes stimulated commercial fishermen to take an interest in the American smelt (*Osmerus mordax*) and other underutilized species of fish as alternate source of income. This interest prompted various industry groups to ask the Bureau of Commercial Fisheries to help develop efficient methods of catching the smelt, which appeared to be the commercial species most readily available in large quantities.

In September 1958 the Bureau began preliminary explorations for smelt in western Lake Erie. A chartered trap net vessel was used for surface-scouting and echo-sounding (Sand and Gordon, 1960). The vessel was outfitted with the conventional trap net reel, single deck gypsyhead, and a lampara seine (fig. 6).

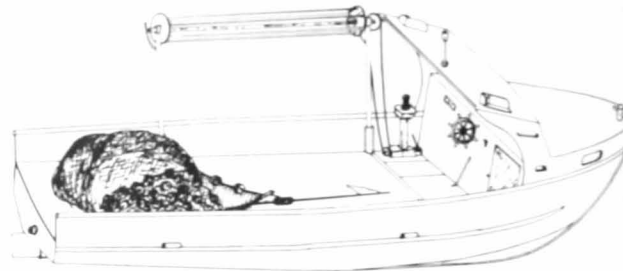


Figure 6.--A trap net vessel fitted with gear for fishing and a lampara seine.

The lampara seine was a modified west coast-type bait seine, 140 fathoms long by 5 fathoms deep (fig. 7). The wings were constructed of 9-thread, 4-inch mesh cotton twine and were 150 meshes deep. The bunt was made of 12-thread, 1-1/2-inch mesh cotton twine attached to a 1/2-inch mesh woven nylon bag.

The lampara seine was put over the stern with a skiff or drag buoy attached to one wing by a 100-foot tow line and set in the usual circular pattern (fig. 8). The net was closed

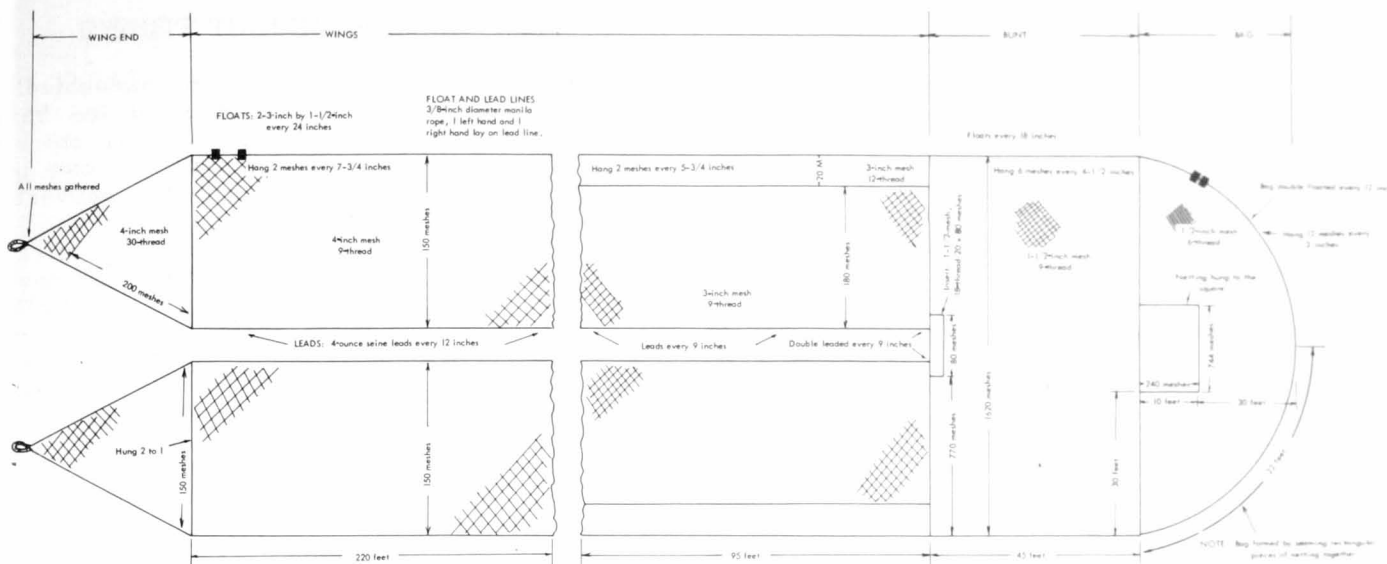


Figure 7.--Construction details of a lampara seine.

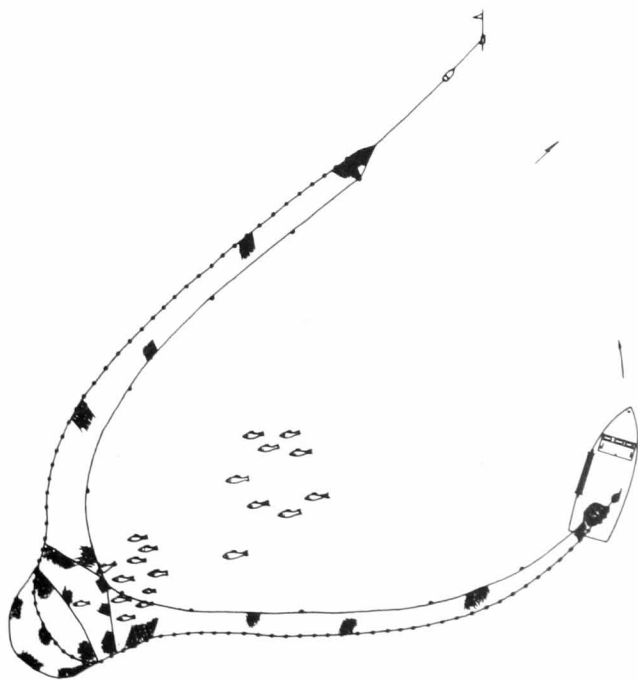


Figure 8.--Setting the lampara seine. Note direction of wind in relation to vessel.

downwind by hauling both tow lines until the wings approached the vessel. The vessel then was swung crosswind, and the wings hauled over the trap net reel (fig. 9). With the trap net reel, it was possible to haul and stack both wings simultaneously and "dry up" the catch in 12 to 15 minutes. This method enabled the crew to set the lampara seine again without restacking the net.

During this survey, which began in September 1958 and continued through November 1959,

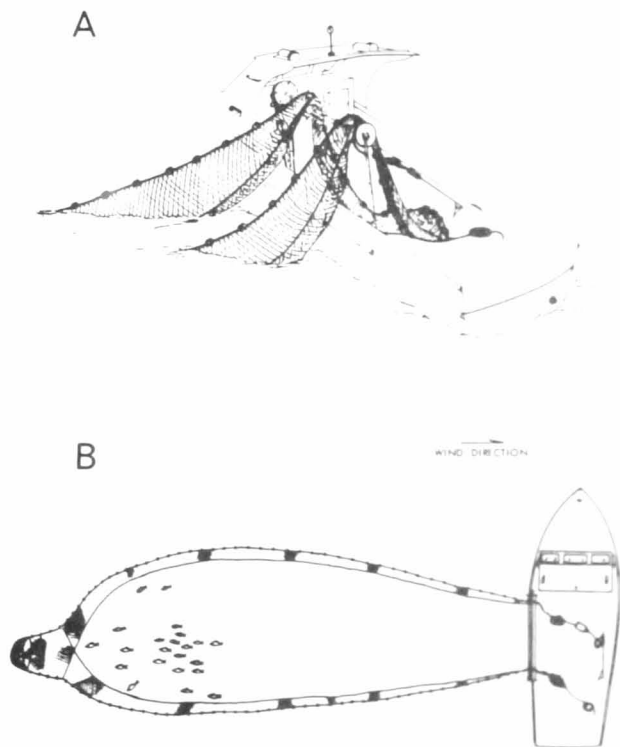


Figure 9.--Hauling the lampara seine. A. The drag buoy has been recovered and the wings started over the hauling reel. B. Closing up the seine as hauling continues on the wings.

hundreds of surface schools of fish were seen in daylight. Most of these schools were composed of bait minnows. Because the primary purposes of the survey were to ascertain the seasonal distribution of the smelt and develop an efficient method of harvest, little effort was



spent on other species. The Bureau's preliminary gear trials, however, did show that the lampara seine is efficient for capturing emerald shiners. Substantial catches of this minnow were made during 10 lampara seine sets when minnows were abundant offshore during the summer. Most of the minnows were released alive, and only a few individuals were retained for identification and biological study (fig. 10).



Figure 10.--Removing a portion of the catch from the lampara seine for biological studies.

## HOW TO IMPROVE BAIT FISHING

The increase in sport fishing undoubtedly will continue, and so the demand for bait minnows will grow. The substantial stocks of minnows in the offshore waters can be fished during the summer if effective harvesting techniques are applied.

Small lampara seines would be more effective than the lift net for catching fish near the attracting light and could substantially reduce time and effort during this phase of the fishery. Because long lampara seines could be fished effectively in daylight, the application of this technique would possibly alleviate the nonproductive summer period. Owing to the scarcity of minnows during the summer, wholesale bait dealers often must now transport minnows from distant areas where they are raised commercially.

## LITERATURE CITED

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