

Red Drum: Past And Future Management

Richard K. Wallace
Extension Marine Specialist

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During 1986, fishermen caught 13 million pounds of red drum (redfish) in state and federal waters. By early 1987, a moratorium was placed on the commercial fishery in federal waters. An initial bag limit of one red drum per day was instituted for recreational fishermen. Soon after, most of the gulf states passed restrictive bag and size limits for redfish, and the federal limit was reduced to zero. Alabama set its limit at three fish with no fish smaller than 16 inches and none larger than 26 inches. This publication examines the condition of the redfish population, why regulations are needed, and what is being done to study and manage redfish, particularly in Alabama.

Fishing History

Recreational fishermen have sought inshore redfish for years, mostly for their fighting ability and for food. Likewise, inshore commercial fishermen were able to find a small market for the redfish they caught in their nets along with other species. Commercial fishermen also knew about huge offshore schools of big adults but there was little or no demand for these larger fish.

This situation started to change in the early 1980s. Americans began consuming more fish (Figure 1). In 1985, a New Orleans chef, almost overnight, turned the red drum into a popular dish—blackened redfish. Commercial fishermen happily reacted to demand and began fishing for adult redfish with fervor. As a result, the redfish catch increased tremendously (Figure 2) and fishermen began to worry about overfishing the adult stocks.

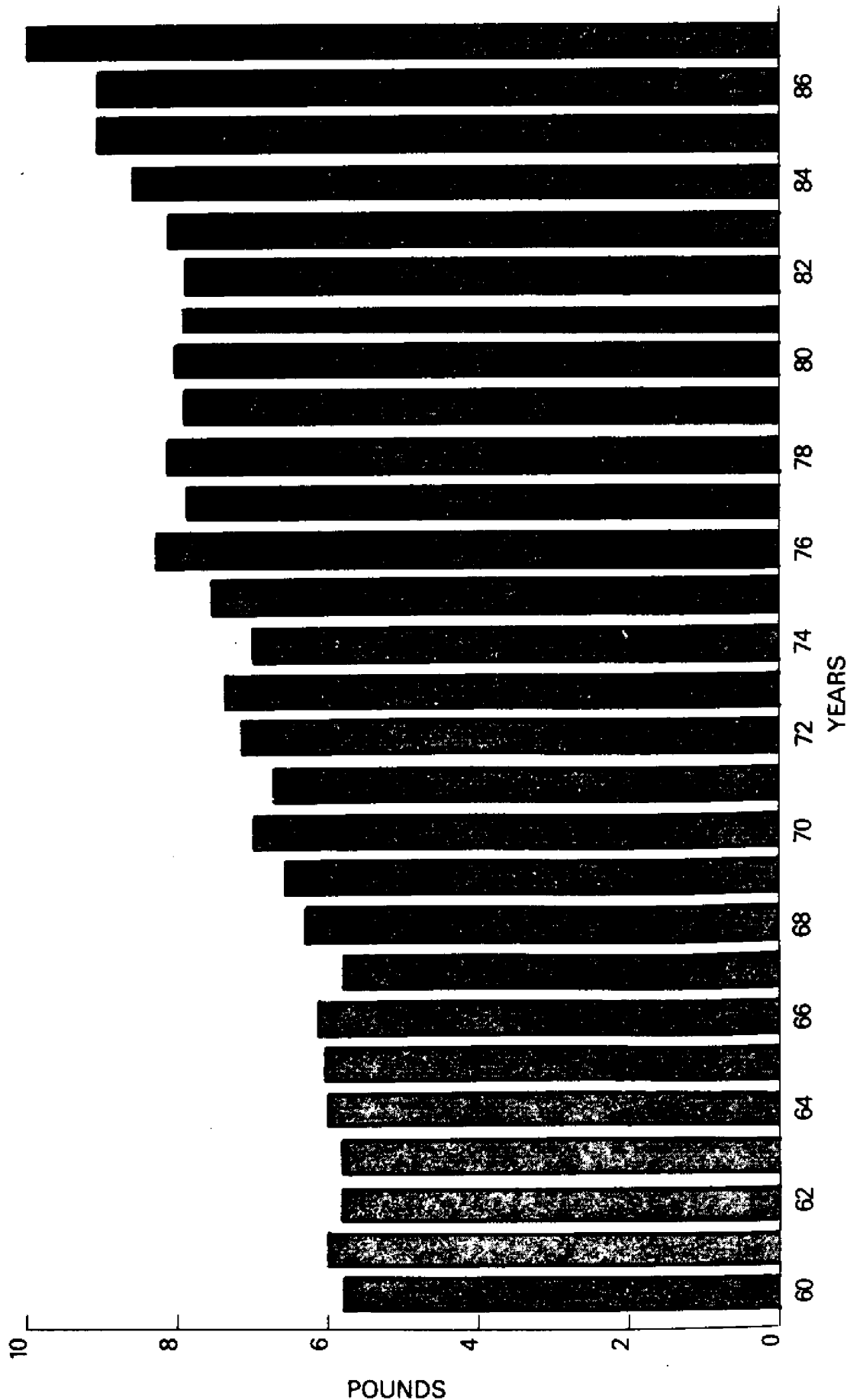


Figure 1. U.S. consumption of fresh and frozen fish and shellfish products, per person, 1960 to 1987.



Figure 2. Alabama commercial red drum catch, 1979 to 1986 (in thousands of fish).

Management History

At the time of the increased harvesting, little was known about the population dynamics of redfish (how they live, grow, move). Even less was known about the offshore part of the population. Given the rapid increase in the redfish catch and the lack of data, federal regulators took a conservative approach. In autumn 1986, the Secretary of Commerce closed federal waters to the commercial catch of redfish; recreational fishermen could bag two fish (later, no redfish could be caught). Since that time, state and federal management agencies have joined forces to develop data on the life history of redfish, more accurate population estimates, and plans for management of the stock to aid recovery.

To understand the federal and state management plans better, it is necessary to look at what is known and what is being learned about redfish.

Basic Biology

Redfish are members of the Sciaenid or drum family. Close relatives include the croaker and spotted seatrout. Redfish grow to a large size; the world record is 90 pounds. Medium-sized 30- to 40-pound fish are commonly caught off Alabama and other gulf states. A redfish can live more than 30 years.

Adult redfish travel in large schools in the open waters of the Gulf of Mexico. Schools of 20- to 30-pound fish have been sighted that could have a total weight of 300,000 pounds. During the autumn months along the northern gulf coast, schools of mature fish spawn off shore. Female fish mature at 4 to 5 years, while males reach maturity in 3 to 4 years. A mature female can produce as many as 2 million eggs in a single spawn. The eggs are released directly into the waters of the Gulf of Mexico.

The eggs are one-thirtieth of an inch in diameter. Floating in the saltwater of the Gulf, they hatch into tiny larvae after only 20 to 25 hours and spend their first 50 to 60 hours of life drifting with the currents. The larvae live on the internal food source of a yolk sac while they complete the development of their mouthparts and functional digestive system. Once the larvae exhaust the yolk sac food supply, zooplankton must be available for the tiny fish to eat or they will die. Zooplankton are microscopic organisms that abound in healthy estuarine systems.

These first days of life are critical to the fragile larvae. Hatchery work has shown that only 50 to 60 percent of the larvae will sur-

vive this transition to eating natural food even under the best conditions. Changes in the salt content, temperature, level of organic and inorganic pollutants, and, of course, marsh habitat can all dramatically affect these survival percentages. The larvae are truly at the mercy of the environment.

As the larvae age, they move into the bays and the marsh areas along the Gulf. There they grow rapidly by consuming great amounts of microscopic organisms. Larvae can increase their length by as much as 5 times in only 300 hours. Within three weeks they expand their diets to include grass shrimp and other small animals. The growth rate slows as winter weather lowers the water temperature. Redfish generally will attain a size of 3 to 5 inches prior to the onset of cool weather and will not grow substantially until the water begins to warm in the early spring. Growth then assumes its previous rapid rate with the fish now feeding on shrimp, small crabs, and small fish.

By the end of the first summer, the one-year-old fish are 12 to 14 inches long. Their population has been severely reduced by predation or lack of food. At this size, they become vulnerable to another predator—man. Recreational fishing is thought to be a major factor in the loss of fish from inshore waters prior to their moving back offshore. Those fish that live to about age 3 leave the estuary and join the offshore population to complete the life cycle.

Recent Research

When scientists first began looking at the offshore redfish population, two basic questions arose:

- Are there adequate numbers of adult redfish to sustain a commercial fishery without jeopardizing spawning capability?
- What is the age structure of the population? (Age structure simply refers to the number or percentage of fish in each age group.)

Two methods were used to determine the number of fish: by estimating the size of schools seen from airplanes and through a tagging program. Using these two methods, scientists estimated that there were 123 million pounds of redfish in the offshore population.

At the same time, the Alabama Marine Resources Division was analyzing age structure by removing small ear bones (otoliths) from the offshore commercial catch. These ear bones have growth rings similar to trees, and the age of redfish is easily determined from them. Analysis of hundreds of these ear bones revealed the following:

- The offshore population was made up of mostly 3- to 20-year-old fish although fish up to 30-years old were recorded.

- Some age groups of fish were not as abundant as expected.
- The number of younger fish in the population was not as high as expected.

The age structure indicated that in recent years something was keeping large numbers of inshore redfish from migrating offshore. And, while old redfish seemed to be plentiful offshore, they were not being replaced in adequate numbers by younger redfish. With this in mind, state and federal scientists began to look at fishing pressure in the inshore waters. The results seem to support the idea that few redfish were escaping recreational and commercial fishermen in their first three years of life. Consequently, few fish were left to join the offshore population and become part of the breeding population.

When these findings became apparent, the Gulf of Mexico Fishery Management Council stopped recreational fishing and urged the states to pass regulations that would allow at least 30 percent of the inshore population to escape. Most of the gulf states responded with stricter regulations, including Alabama, which imposed the three-fish bag limit with no fish smaller than 16 inches or greater than 26 inches.

Alabama Research Program

Redfish management is now focused on the inshore waters. The Alabama Marine Resources Division (MRD) is pursuing a plan of several approaches to conserving and managing the stock. The MRD monitors the abundance of redfish larvae and juveniles at several sampling stations in Alabama waters. The number of redfish caught form an index. Over time, the index will be used to predict the strength of each year's spawn and the relative survival of larvae to the juvenile stage. This sampling technique has been in place since 1981, and the data base is now sufficient to determine the trends in both the success of the offshore spawn and the survival of young fish in the estuary.

Tagging studies conducted by MRD indicate that redfish show little movement in their first two years. The studies also show that recreational fishing catches more than half of the inshore sexually immature population of red drum each year. With natural mortality, this indicates that few individuals are surviving to return offshore to spawn.

During 1987 and 1988, the MRD tagged and released 235 wild-caught redfish. Fifty tags were returned (25 percent return rate). Forty-six percent of these did not move from the release point (Figure 3). Those fish that did move traveled randomly in all directions. The

lack of movement is further illustrated in Figure 4, which shows that 88 percent of the fish were recaptured within 9 km (5.6 miles) of the release point. Most fish were recaptured within 49 days from release (Figure 5). Few were recaptured after 249 days.

In addition to tagging wild-caught fish, the MRD has raised and tagged more than 40,000 redfish in the past two years. These hatchery fish are grown under carefully controlled conditions until they weigh just over an ounce. They are then marked with an internal anchor tag and released.

Two hundred and eight tags have been returned since the initial hatchery release on September 3, 1987. Of these, 24 percent of the recaptured fish showed no movement. Those that did move were found within 9 km (5.6 miles). Sixty-one percent of the fish were recaptured within 99 days, and 79 percent of the recaptures came within 200 days.

Although the number of tags returned is relatively small, it appears that hatchery fish are acting very much the same as the wild fish. Continued monitoring of the data should allow for more direct comparison. Over a period of time the tagging study should reveal whether or not Alabama is allowing at least 30 percent of its redfish population to escape and join the offshore breeding population.

Meanwhile, surveys of recreational fishermen indicate that the new size length regulations are having an effect on the fish caught in Alabama. Figure 6 indicates that prior to regulation, most recreationally caught fish were 14 to 15 inches long. Since the regulation, most fish caught are 17 to 18 inches.

The MRD is continuing the successful hatchery program. More small redfish are being tagged and released. With the federal government and other gulf states, the MRD is working hard to ensure future supplies of redfish. Stricter harvesting regulations and tagging studies implemented and undertaken in Alabama are providing the basis for recovery of redfish populations. Conservative, sound management and scientific studies that produce accurate assessments of the stock will be the keys to continuing this already successful effort.

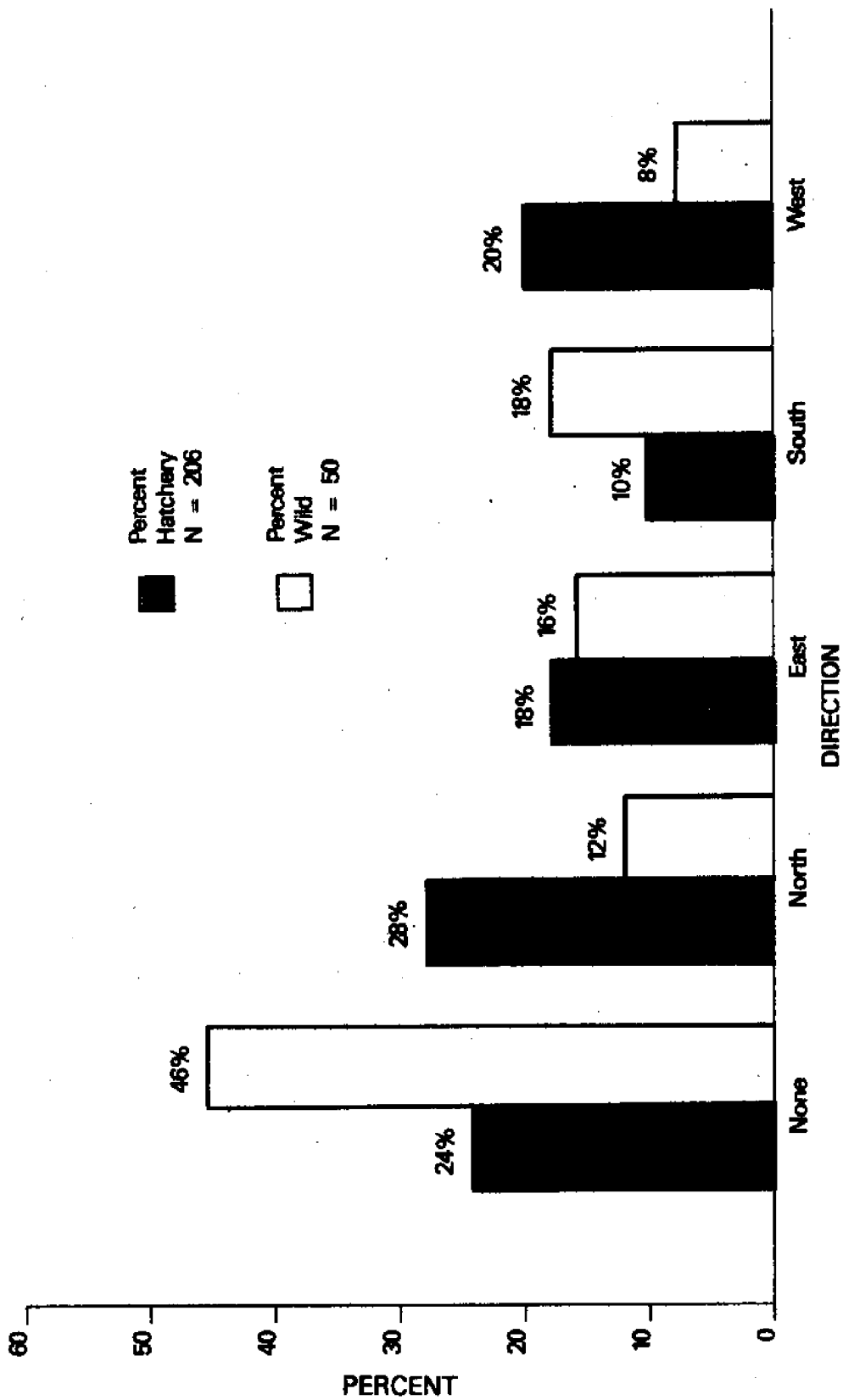


Figure 3. Direction of movement of hatchery reared and wild-caught red drum (percentage).

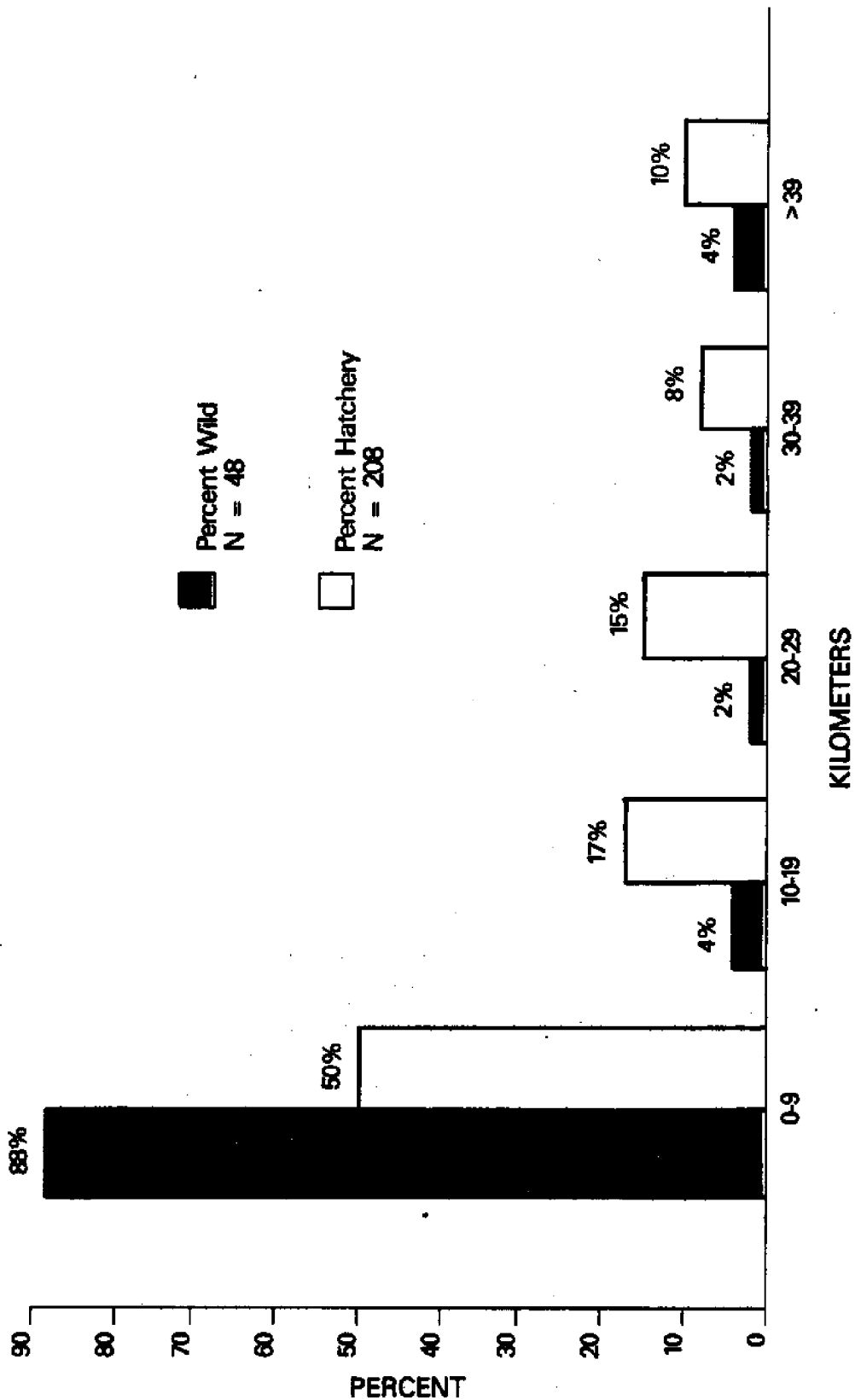


Figure 4. Distance from release point of hatchery reared and wild-caught red drum tag returns (percentage).

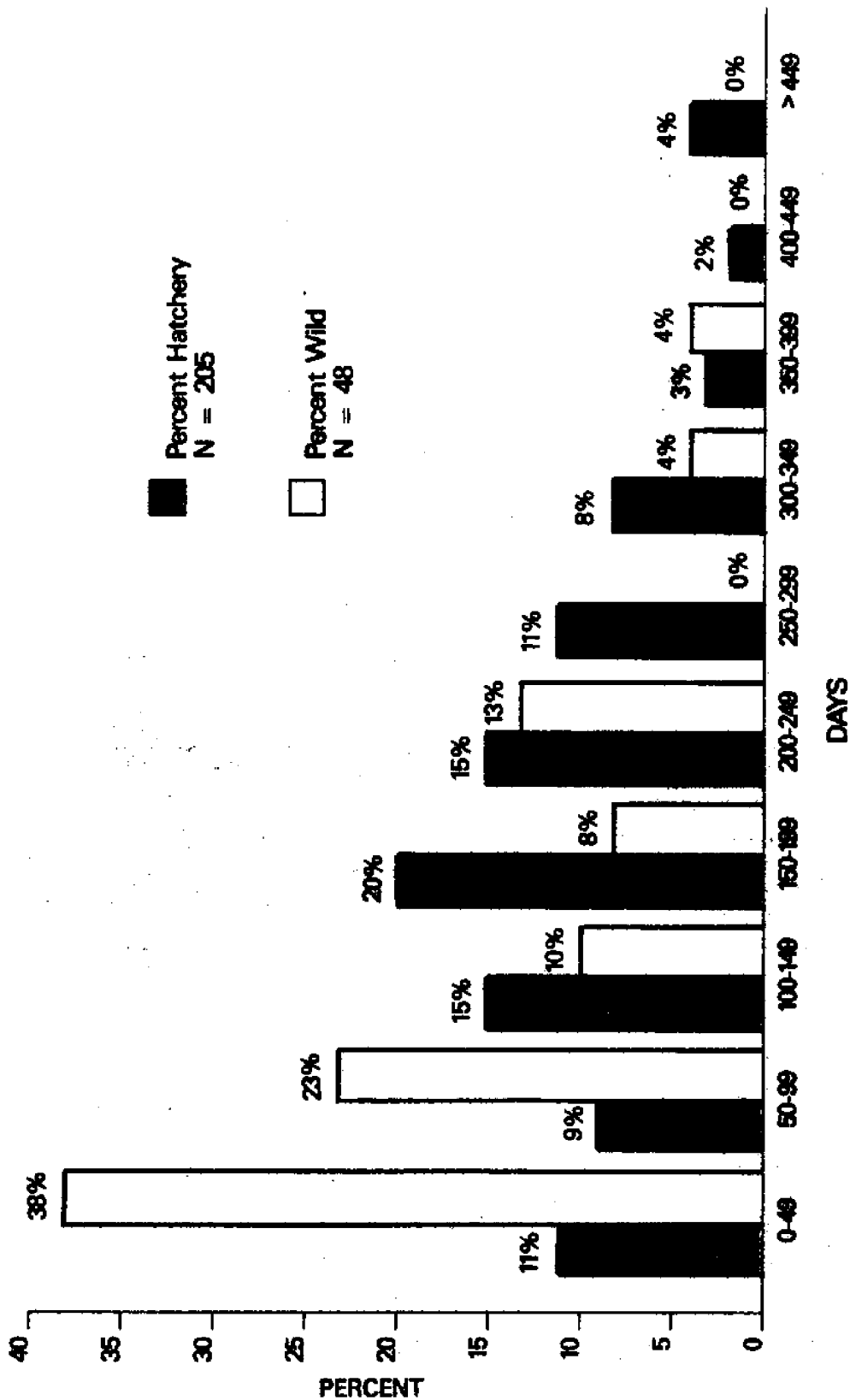


Figure 5. Days from release to recapture of hatchery reared and wild-caught red drum (percentage).

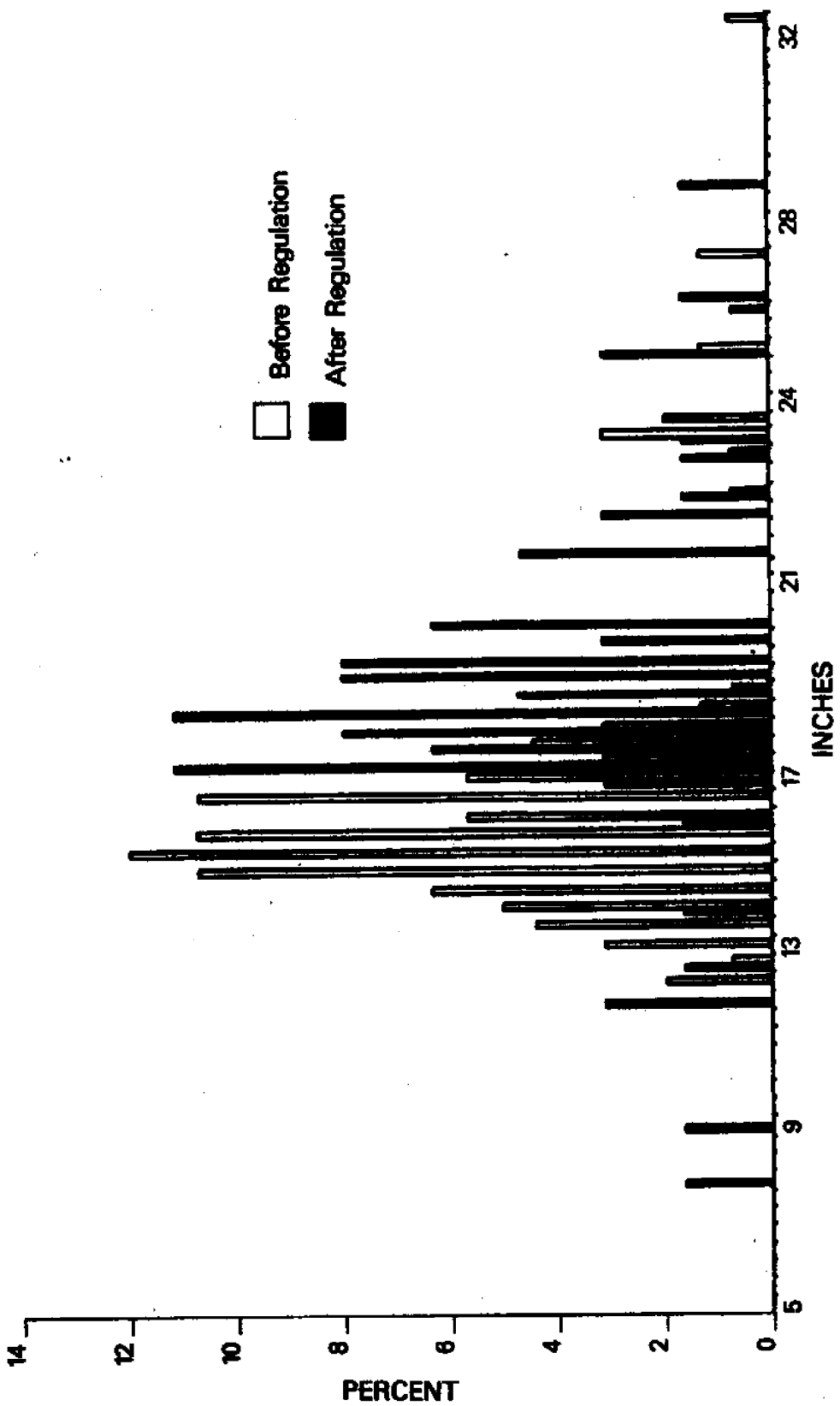
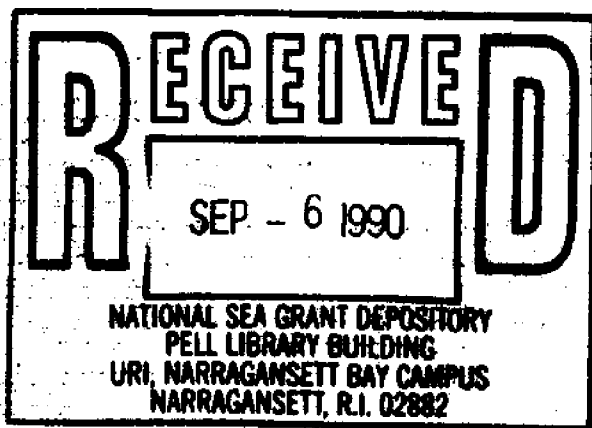


Figure 6. Length of recreationally caught red drum from Alabama, before and after the regulation change (percentage of frequencies).



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