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New Jersey

Outdoors

VOL. 12, NO. 1

DIVISION OF FISH AND GAME

JULY, 1961



why?



why?

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Published monthly by the State of New Jersey Division of Fish and Game
in the interest of conservation and restoration of wildlife and
the betterment of hunting and fishing in New Jersey.

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Cover—"THIS IS THE LIFE"—*Harry Grosch*
Camping at Saw Mill Lake in High Point Park

Editor: **Bob Adams**

Vol. 12, No. 1, July, 1961

Publication Office: DIVISION OF FISH AND GAME,
230 West State Street, Trenton 25, New Jersey

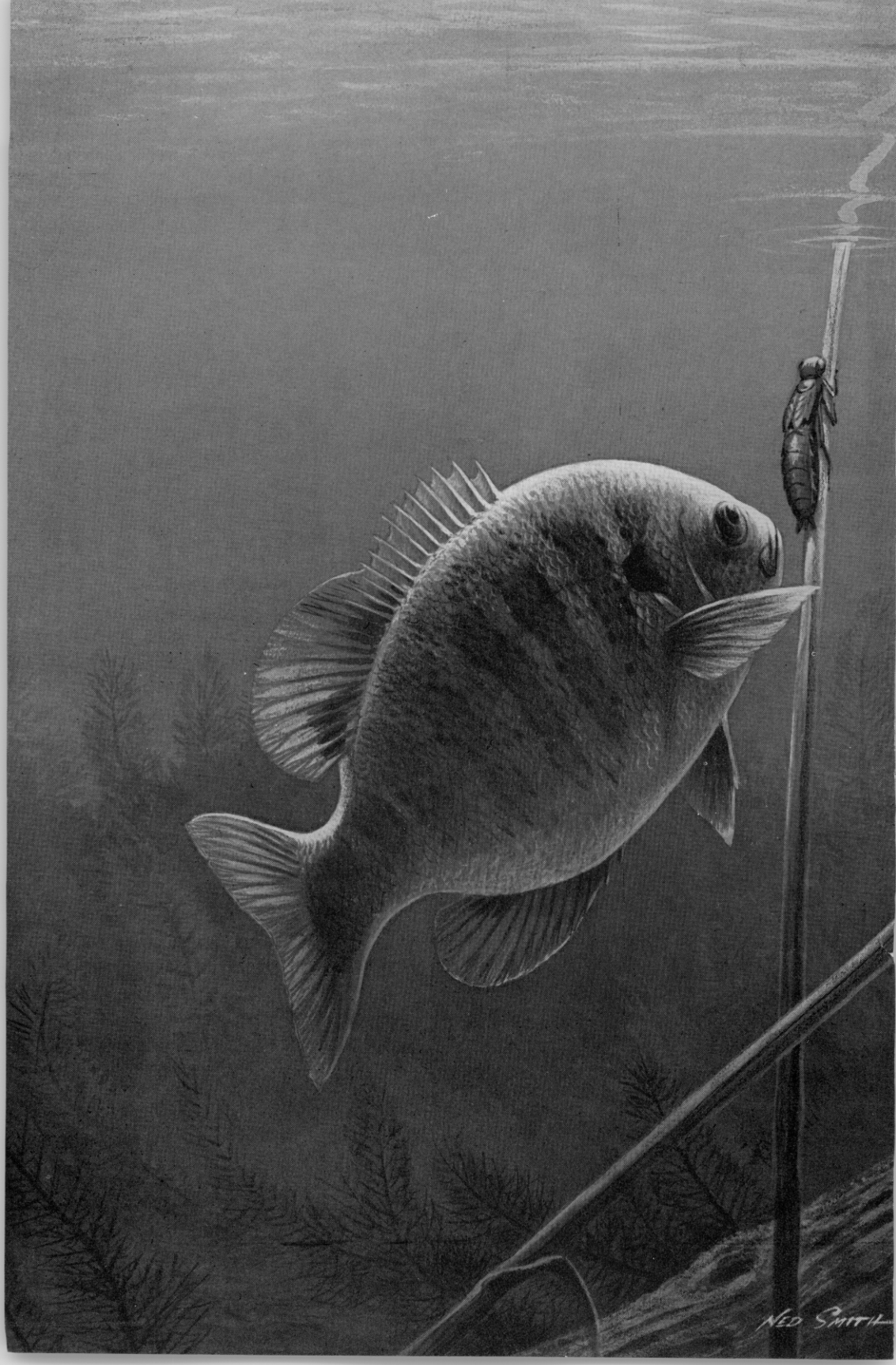
Second class postage paid at Trenton, N. J., and additional mailing office.

Subscription: \$1.00 a year, by check or money order, payable to Division of Fish and Game. Cash is forwarded at sender's risk. No stamps, please.

Change of Address: Should be reported directly to the Editor. Send both old and new address. The Post Office will not forward copies unless forwarding postage is provided by subscriber. Copies not delivered through failure to send change of address six weeks in advance cannot be replaced.

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BLUEGILL

Prince of Panfish

By R. FRANKLIN DUGAN, Biologist

United States Soil Conservation Service

MENTION ANY classification of game animals, and one species in the group immediately comes to your mind as being "tops" for sport, or food, or both. But usually there will be many other sportsmen whose favorite game is not the same as yours. For instance, the wild turkey is considered the king of American game birds by a large number of hunters. Yet there are probably just as many nimrods who would fervently nominate the ruffed grouse or the bobwhite quail for that title. Similar competition would be found among disciples of rabbit, squirrel, and raccoon hunting. And perhaps the most heated arguments of all are generated among fishermen discussing the comparative fighting qualities of small-mouth bass or largemouth bass, brook trout, pickerel, salmon, or muskellunge.

However, when it comes to panfish (that rather loosely-defined group of fish which are notable for the ease with which they fit into a frying pan, and the delectable morsels they provide when taken out of said frying pan) there is very little argument as to which species deserves top rank. Prac-

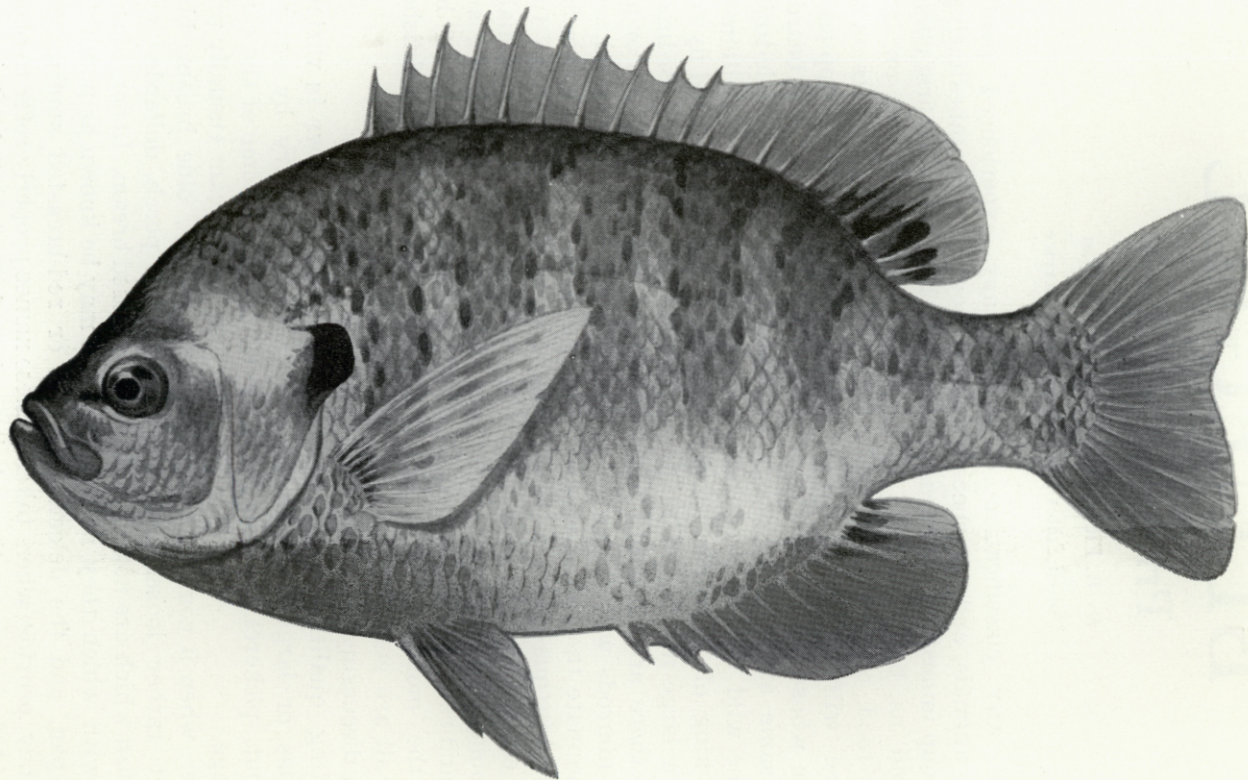
tically any experienced panfish angler you ask will unhesitatingly name the bluegill as his first choice, both for exciting sport on light tackle, and for tasty treats on the dining room table. This applies to the barefoot boy and the bearded patriarch; to the cane pole-toting pickaninny and the millionaire Waltonian with gold plated fly rod. But most of all to the ordinary fisherman, someone like you or me, whose fishing time is limited, and who wants to go after a game fish that can be depended on to furnish plenty of action, occasionally put his tackle to a real test, and bring smiles to the faces of his family when they taste the finished product.

Taxonomy

The bluegill is known in various parts of the country by several different names. Some of the common ones are: bream (usually pronounced brim), blue bream, blue sunfish, blue perch, dollardee, and copper-nosed bream. In some localities it may be known as pumpkinseed or red-breasted sunfish, but these names properly refer to other species of sunfish. Scientist avoid all this confusion by using the Latin name, *Lepomis macrochirus*

4 Back—Dark green, olive, or bluish green

Sides—Seven or eight vertical bars



Gill flap—Blue-black, almost square

Dorsal fin—Dark spot on base at rear

How to Identify the BLUEGILL

. . . *Bluegill*

Rafinesque, which is not likely to become popular with most fishermen.

Pursuing the scientific classification a bit further, we find that the bluegill belongs to the family *Centrarchidae*, which includes not only the numerous varieties of sunfish, but also both largemouth and smallmouth bass, rock bass, and crappie. One of the characteristics of this family is a dorsal or top fin containing several stiff, sharp-pointed spines. Many a beginning fisherman has had this fact forcibly brought to his attention when he has seized a flopping bluegill with more eagerness than caution.

Description

The bluegill has a typical sunfish shape, though slightly deeper-bodied than most of its cousins. The body depth varies from about one-fourth to almost one-half of the total length, with the largest specimens coming the closest to being saucer shaped if the tail is cut off or ignored, it becomes easy to understand why several kinds of sunfish are known as pumpkinseeds or tobaccoboxes.

Bluegills exhibit a considerable variation in color, at different ages, different times of the year, according to sex, and between different individuals. The basic pattern, however, is rather stable. The back is dark green to olive or bluish green, and this dark color extends in seven or eight vertical bars a little over half way down the sides

of the body. The rest of the body is dusky orange to bright orange or yellow. In breeding season, the adult males sport a deep orange breast, while the breast color of the females is a bright lemon yellow. Immature bluegills are usually quite bluish, with darker bars extending down from the backs like their parents. The face and cheeks of the bluegill are olive green to coppery, becoming blue on the lower sides, and typically do not show any of the worm-like stripings that are characteristic of several other species of sunfish.

The bluegill takes its name from the deep blue-black "ear," or gill flap. This color extends all the way to the rear edge of the gill flap, and there are no light-colored or red spots on the flap. The flap is almost square; the only other sunfish with gill flaps of solid dark color have elongated flaps, with rounded ends. A dark spot on the base of the rear part of the dorsal fin is another identifying characteristic.

A purely analytical description of color marking is pretty dull reading, but the bluegill itself is anything but dull. The brilliant contrasts of olive green, iridescent blue-black, and bright orange or lemon yellow presented by an adult bluegill in breeding season add up to one of the most beautiful fish to be found outside of tropical waters.

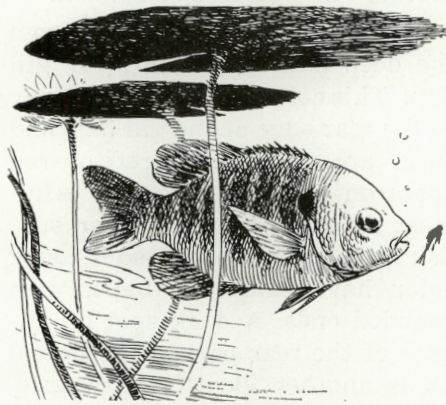
It must be admitted that the bluegill's moral code is not particularly strict, and when other species of sunfish are present, hybridiza-

. . . Bluegill

tion is not uncommon. The matter of identifying these hybrids then becomes quite complicated, to say the least.

Distribution

The bluegill is widely distributed in North America. LaMonte (1946) lists its range as "Minnesota, Great Lakes to Lake Champlain; Mississippi River to Florida and Arkansas; north from Florida to New Jersey." New Jersey, however, was not included in the original native



Bluegills are primarily carnivorous

range of the bluegill. The earliest introduction officially on record for this state is the stocking of 1200 bluegills in Carnegie Lake in 1913. Undoubtedly there were earlier introductions which were not officially recorded. Today, bluegills are commonly present in practically all warm-water (defined as reaching surface temperatures of 80°F. during summer) streams and im-

poundments in New Jersey, except those in which the pH* is less than 5.0.

Most of the ponds in the Outer Coastal Plain, except a few areas in Cape May County, are too acid for bluegills to reproduce successfully. But throughout the Upper Coastal Plain, the Piedmont and a large portion of the Highlands, bluegills are one of the most regularly occurring species. They have been widely used in New Jersey and many other states during the past two decades for stocking farm ponds and small lakes. In these situations, they are usually stocked in combination with largemouth black bass.

It is safe to say that there is plenty of excellent fishing for bluegills, either in natural waters or impoundments, within a half-hour's driving time of any angler in New Jersey.

Size and Growth Rates

The rate at which bluegills grow is directly related to their food supply. In well-fertilized ponds, bluegills have been reported to grow to lengths of six to eight inches in one year. This is exceptional, however. The average lengths of bluegills in north Jersey lakes is as follows:

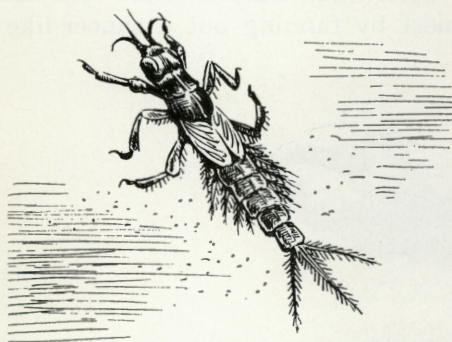
At one year old	3.0 inches
At two years old	4.6 inches
At three years old	6.0 inches
At four years old	7.2 inches
At five years old	8.0 inches

They run slightly larger in the

*The use of the symbol pH is a convenient method of expressing mild acidity or alkalinity of water and other substances. A pH of 7.0 indicates neutrality; lower readings, to below -1. indicate increasing acidity, while higher readings up to 14.0, increase alkalinity.

better south Jersey lakes, and in fertilized farm ponds where they are not overcrowded. Water temperature is also important. Bluegills grow best at temperatures between 60° and 80°F. and show little or no growth in the winter months.

Five-inch bluegills average about one and a quarter ounces; six-inch ones a little under two ounces;



Insect larvae are important foods

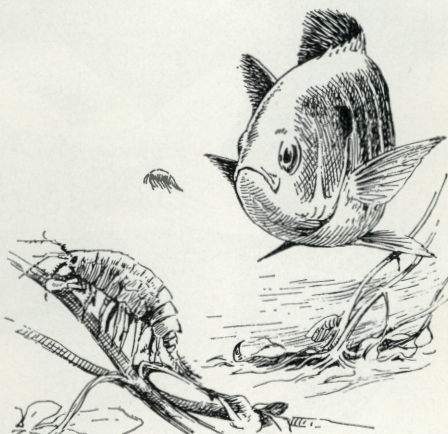
seven-inch about three and three quarters ounces; and eight-inchers a little over seven ounces. It takes at least a ten-inch bluegill to weigh a pound, and few are caught above that size. The New Jersey record, however, is two pounds, and the world's record is an almost unbelievable four and one quarter pounds, taken in Ketchikan Lake, at Birmingham, Alabama.

To most anglers, bluegills above five inches are acceptable, and anything over six inches is a "nice one." The real thrills are furnished by occasional strikes from eight to twelve-inch fish. When one of these

hits light tackle, even the most experienced fisherman is apt to think he has tied into a lunker bass.

Food Habits

Bluegills are primarily carnivorous — that is, animal life makes up most of their diet. It is true that newly-hatched fry feed for a short period on plankton (minute organisms floating free in the water). At this stage, they utilize both the animal forms (zooplankton) and the plant forms (phytoplankton, chiefly algae). Very soon, however, the young bluegills graduate to larger forms of food, and from then on, they become almost completely carnivorous. The main items on the menu of advanced fry,



Crustaceans may be staple items

fingerling, and adult bluegills are worms, small crustaceans, and a wide variety of insect larvae. Large bluegills will also eat some aquatic vegetation, especially in situations where competition for food is strong. Under such conditions, fish eggs and small fish are also apt to be taken by the large bluegills. In

. . . Bluegill

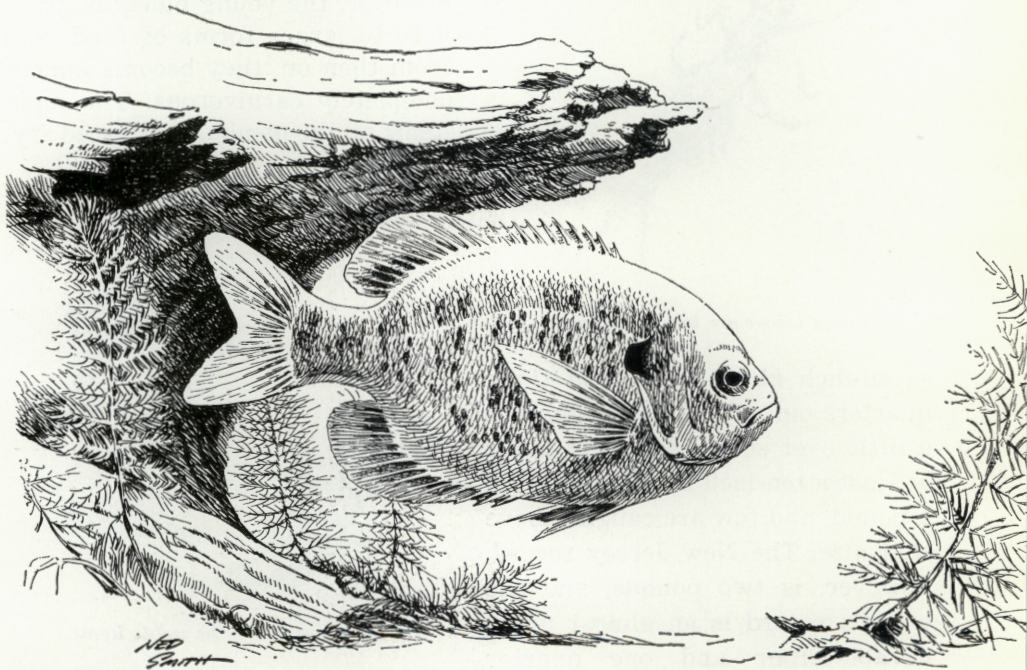
bass-bluegill ponds suffering from an over-crowded bluegill population, the bluegills feed so heavily on bass eggs and fry that the bass are not able to reproduce successfully enough to maintain their numbers.

Reproduction

Spawning activity begins when the water temperature reaches approximately 75°F. In New Jersey,

throughout the summer, as long as these temperatures are maintained. Usually the bulk of the spawning occurs in late June or early July, followed by one or two lighter spawns in July and August. Crowding tends to retard spawning, and in a pond overpopulated with bluegills, there may be only one spawn, rather late in the season, or in extreme cases, no successful spawn at all.

The male bluegill constructs the nest by fanning out a saucer-like



Bluegills seldom spawn until the water temperature goes above 75° F.

this is usually in May or June, the exact date varying with the elevation and the individual year. The eggs hatch at temperatures of 80°F. or above, and in well-balanced ponds bluegills often spawn more or less continuously

depression in the bottom of the pond or stream. Most nests are built in water from six inches to two feet in depth, but in cases where there is a limited amount of shallow water, some nests may be found much deeper than this.

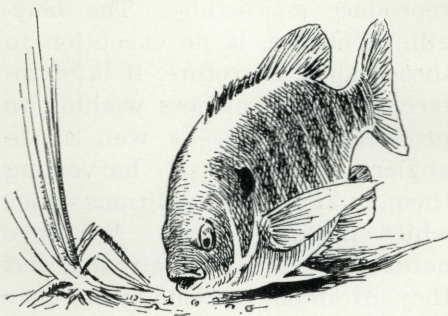
Individual nests vary from two to six inches in depth, and from about six inches to two feet or more in diameter. The dimensions depend mostly on the size of the male which builds the nest, and the type of material in which it is built. Occasionally, single nests may be found, but as a rule they are built in colonies, with the edges of adjacent nests touching each other. If not destroyed or exposed by a lowered water level, the same nests are usually used repeatedly throughout the spawning season, though not necessarily by the same individual fish.

When the male has finished cleaning out the nest excavation, he allows one or more females to deposit their eggs in it. The male fertilizes the eggs, then vigorously defends the nest against invasion by other male bluegills or by fish of any other species. He dresses in his brightest colors for this occasion, and a colony of bluegill nests guarded by six-inch to nine-inch males presents one of the most colorful sights to be found in any of our fresh water areas.

The eggs are golden yellow, and adhere both to each other and to the pebbles or mud in the bottom of the nest. To those unfamiliar with the reproductive habits of fish, the number of eggs laid is somewhat staggering. A single female bluegill (or should we say a married one?) will lay from about 3,000 to as high as 67,000 eggs at each spawning, and may spawn two to four times in one year. The number of eggs produced depends

on the size of the female and her food supply prior to the spawning season. The number of times she spawns is dependent on the length of time the water temperature stays above 80°F. Kirkwood (1953) reports that in Kentucky, a four-inch female produces about 12,000 eggs per year, while a nine-inch female produces about 50,000 in the same period.

The eggs usually hatch in a few days after the water temperature reaches 80°F. or above. The fry, or newly-hatched fish, are golden in color, like the eggs, but soon lose this color, and become a very light bluish-grey. During their first season, they are transparent enough so that the ribs and backbone are visible through the flesh. The number of fry produced from one nest is quite variable, but in general is greater in the larger nests built and guarded by the larger males. In



They will eat fish eggs

some cases, only one female will deposit eggs in a nest, but more commonly, one nest will contain eggs from two or more females. One female may also deposit eggs in two or more nests. In actual counts of fry taken from 17 nests in a Michi-

. . . Bluegill

gan lake, Carbine (1939) found the number varying from 4,670 to 61,815 with an average of 17,914 fry per nest.

The newly-hatched, golden fry are nearly motionless, and while they remain in the nest, are still guarded by the male. When they lose this color, and begin to swim outside the boundaries of the nest, however, they are strictly on their own. From that point until they reach a size of three or four inches, the young bluegills are heavily utilized for food by predaceous fish such as the largemouth bass.

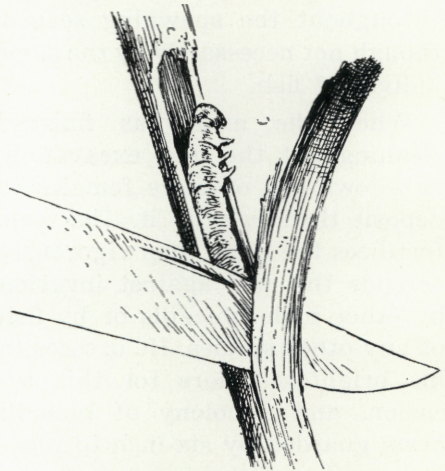
Ecology

The distribution of any plant or animal is limited by the range of environmental factors it can tolerate. The same environmental factors delimit an even smaller range in which a species will grow and reproduce successfully. The bluegill, of course, is no exception to these rules. Therefore, it is of interest to pond owners wishing to produce bluegills, as well as to anglers desirous of harvesting them, to know the conditions under which bluegills thrive. We have noted some of these already, but they are important enough to bear repeating here.

Water temperature is a definite limiting factor in bluegill distribution. Although bluegills will survive temperatures just short of freezing, as well as the warmest water found in ponds under any normal circumstances, they are definitely a warm-water species,

and will not reproduce in situations where the water does not warm up to at least 80°F. at some time during the year. They make their best growth during the periods when the water temperatures are between 60° and 80°F.

The chemical reaction of the water has a more drastic effect on the bluegill than does the temperature. It can not only prevent reproduction, but in extreme cases, actually kill adult fish. Bluegills do

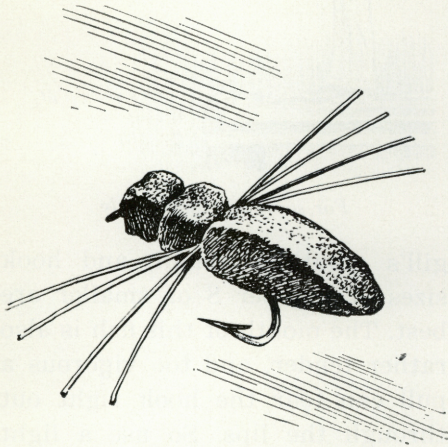


"Worms" are productive bait

not reproduce in water with a pH value of 4.8 or lower, and cannot survive at pH levels of less than 4.0. Less information is available on the effects of alkalinity, but it is probable that spawning is retarded at pH readings over 10.0. Low pH is the factor which prevents establishment of bluegill populations in most untreated ponds in the outer coastal plain of New Jersey.

Of particular interest to the angler and the pond owner is the bluegill's response to dissolved

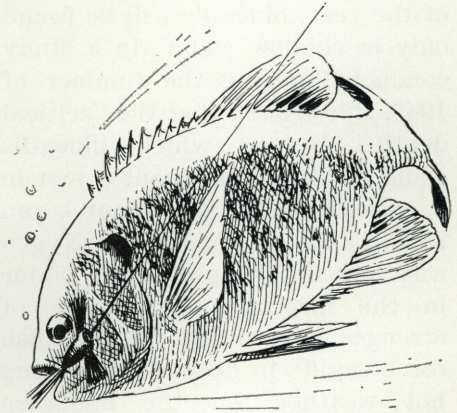
oxygen and carbon dioxide. Expressed technically, Byrd (1952) found that bluegills were unable to survive for more than a few hours in water which contained less than 0.3 parts per million of dissolved



Soft rubber lures are good

oxygen when accompanied by a concentration of 4.4 parts per million, or more, of carbon dioxide. But this technical description means little to the average angler, who does not carry a chemical laboratory in his tackle box. For practical purposes, we simply need to remember that bluegills like plenty of oxygen, accompanied by very small amounts of carbon dioxide. This is because fish, like all other animals, must breathe to live. In the breathing process, they use oxygen and give off carbon dioxide. Plants do the same thing. However, in the presence of sunlight, green plants carry on another process, called photosynthesis, which builds up the cells and tissues in their body structure. This process uses

up carbon dioxide, and produces oxygen at a much greater rate than the plant uses it in breathing. Therefore, in a pond or stream containing green plants (even microscopic forms), oxygen is usually produced in excess of fish needs during the daylight hours, as far down through the water as sunlight penetrates. At night, however, or on very dark, cloudy days, the plants use up more oxygen than they produce, and so compete with the fish for the available supply. Under normal conditions, the oxygen produced by photosynthesis



Bluegills have plenty of scrap

(which also keeps the carbon dioxide at a low concentration) on sunny days, plus the free oxygen dissolved from the air, is more than sufficient to supply the needs of both fish and plants during the hours of darkness. Occasionally, however, a large amount of dead, decaying organic matter in the water may use up the available oxygen to the point where fish are killed. The same conditions can

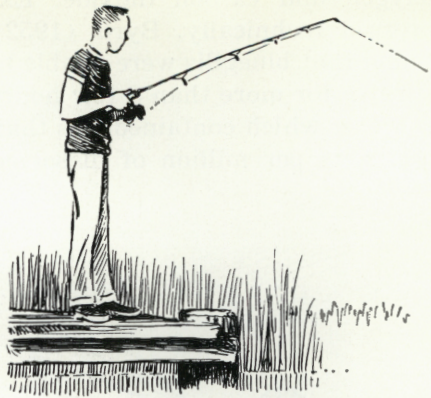
. . . *Bluegill*

occur on warm summer nights (or even hot, cloudy days) in ponds or sluggish streams which contain an excessive amount of plant life.

During the hot summer months, the deeper portions of ponds and lakes almost always contain too little oxygen and too much carbon dioxide for bluegills to survive. This is because sunlight cannot penetrate beyond a certain depth, and the warm surface layers, containing plenty of oxygen, do not mix with the colder water at the bottom of the pond. At this time of the year, bluegills will be found only in shallow water. In a study conducted during the summer of 1949, Byrd found that the "critical depth," beyond which bluegills could not live, was about 5 feet in a two-acre pond and about seven feet in a 22-acre pond. The oxygen was mixed through deeper water in the larger pond because of stronger wave action. So, don't fish for bluegills in deep water during hot weather, on the mistaken theory that they will be seeking refuge in cool, deep water.

Fishing Techniques

Bluegills can be taken with hook and line in any month of the year. The most successful methods, however, vary with the season. Invariably, though, the best sport is secured by using light tackle. Most bluegills are not heavyweights, but they have plenty of scrap, and produce real action when pitted against a light flyrod, with a fine leader and small hook. The blue-

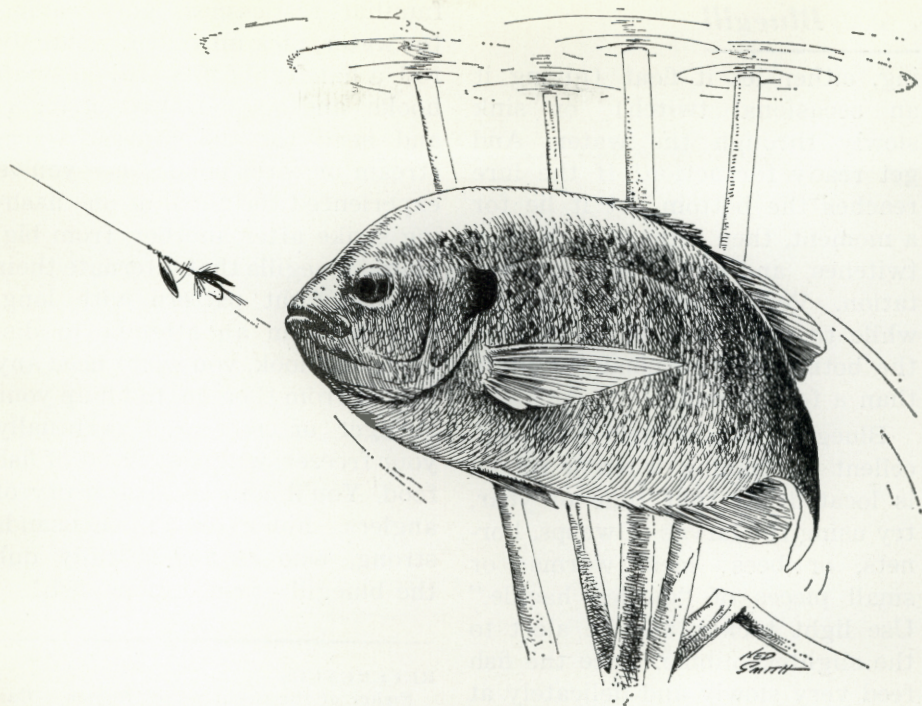


For sport use light tackle

gill's mouth is small, and hook sizes of number 8 or smaller are best. The mouth of this fish is also rather tender, and too vigorous a pull can tear the hook right out through the lips. So use a light leader and tippet, set the hook with a quick snap of the wrist, and don't try to "horse" your bluegill out before he has been tired down to submissiveness.

Bluegills are sociable fish, and will be found in schools at all times of the year. Experienced anglers sample various spots in a pond or stream until they catch a good-sized fish. Then they concentrate on that area, usually finding plenty of additional sport in the same spot.

There are times when bluegills grab practically any kind of bait you throw into the water. At those times, all you need to do is locate the schools with the biggest fish, and proceed to fill your stringer. But on other occasions, you may find bluegills very selective. Then it pays to have a wide variety of flies, bugs, nymphs, and grubs in



For larger bluegills try a small wet fly behind a single spinner

your tackle box, and keep changing lures until you find one the fish like. As a general rule, dark-colored patterns are best. One of the most successful lures I have seen used in New Jersey is a soft rubber cricket. Another "killer," specially for the larger bluegills, is a small, dark-colored wet fly, used behind a small, single-bladed spinner. It is important to find a spinner that will revolve very readily, and work it as slowly as possible, while still keeping the spinner whirling.

Favorite live baits include worms, crickets, grasshoppers, and various insect larvae. Freeman (1958) recommends the "weed worm," the larva of one of the

Owlet moths, which develops in the stem of giant ragweed. To collect these, locate giant ragweed plants (usually in moist, fertile soil), and look for a small hole in the stem, where the worm has entered. Cut the stem about four inches on each side of this hole, and drop it into your bait box. When ready to use it, split the stem and take out the worm. These worms are very tough, and Freeman says one worm may take 8 or 10 bluegills.

When fishing either live bait or flies in shallow water (up to 5 feet deep), cast carefully so the lure lights as gently as possible on the surface of the water. Then, depending on how the fish are feed-

. . . Bluegill

ing, either let it float (giving it an occasional twitch), or sink slowly through the water. And get ready for action! If the lure reaches the bottom, let it lie for a moment, then retrieve it in slow twitches, and repeat the presentation. Very seldom is it worthwhile to allow bait to lie still on the bottom of the pond for more than a few seconds.

Bluegills can furnish some excellent ice fishing when a school is located. At that time of year, try using the larvae of wasps, hornets, or bees; meal worms; or small pieces of "garden hackle." Use light tackle, and be alert to the slightest nibble, since the fish feed very slowly and delicately at that time of year.

For some peculiar reason, bluegill fishing has never been very popular in New Jersey. This is hard to understand, because in many states the bluegill ranks at or near the top in angler preference. Eddy and Surber (1947) list the bluegill as the number one sport fish in Minnesota. It makes up nearly one half the total catch of summer anglers in that state.

One thing is certain—ounce for ounce, the bluegill will compete with any fish that swims when it comes to putting up a good scrap for the fly fisherman. And most gourmets agree that it is hard to find any other fish flesh to compare with the mild flavor and flaky texture of fried, baked, or broiled bluegill. So next time you feel that

familiar restlessness and craving for water, pick up your favorite fly rod, a handful of flies tied on small hooks, and a good stout stringer, and head for the nearest warm stream or farm pond. Once you've experienced the thrill of one flashing strike after another, from big, plump bluegills that alternate their circular fight pattern with long, deep runs in an attempt to dislodge the hook, you won't need any urging from then on, to fill up your stringer or creel, and eventually your freezer, with this finest of fish food. You'll join the fraternity of anglers, hundreds of thousands strong, who enthusiastically dub the bluegill—prince of panfish!

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WHY TAG

the HOW and WHY of Marking Fish

By DONALD N. RIEMER

Junior Fisheries Biologist

MANY PEOPLE are more or less aware of the fact that biologists sometimes tag fish. Most of them, however, have just a vague idea of what this really means and why it is done.

Actually, tagging is just one of many methods which have been used by fisheries biologists for marking fish so that they may be recognized when they are recovered at a later date. This system of marking and recovery is one of the most valuable techniques available to the fisheries worker. It has found widespread use in both fresh and salt water investigations since it was first used on Atlantic salmon more than 85 years ago.

Although tagging is still one of the most commonly used methods of marking fish, many other techniques have been devised such as clipping off fins, tattooing, use of dyes and radioactive tracers, and treatment with chemicals to make certain internal organs visible to X-rays. Recently, a small radio transmitter was developed which can be fastened to a fish. This

makes it possible to follow the fish by means of a receiver tuned in to the fish's frequency. Of all these methods, however, only tagging and fin clipping are in widespread use at the present time.

Tagging

Tagging consists of fastening a piece of metal, plastic, or other material to a fish. This sounds simple enough, but there are many problems which must be taken into consideration. How long will the tag remain attached to the fish? Will the tag interfere with the normal habits or growth of the fish? Is it noticeable enough so that an angler catching the fish will have a good chance of discovering it? These, and a multitude of other questions must be answered by the biologist before he can undertake a sound tagging program.

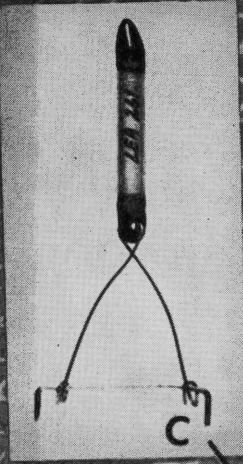
In attempting to solve these problems many different types of tags have been devised. These have ranged from metal strips placed inside the body of the fish to plastic disks pinned on the outside of the fish at various places

On pages 16 and 17 an illustration shows the types, methods, and locations of various marking and tagging systems used on fish

Cut ends,
insert inside
new card

Send this paper to Fisheries Secretary, St. Stephen's House, Victoria Embankment, London, E. W. 1, with full particulars of fisherman's name and address, date and place of capture, gear used; and weight and length of fish (from tip of snout to fork of tail). Enclose about 30 scales scraped from shoulder of fish just behind gill covers. A REWARD WILL BE GIVEN.

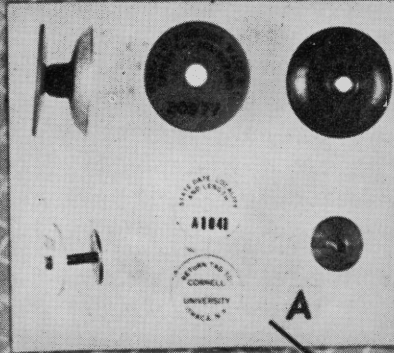
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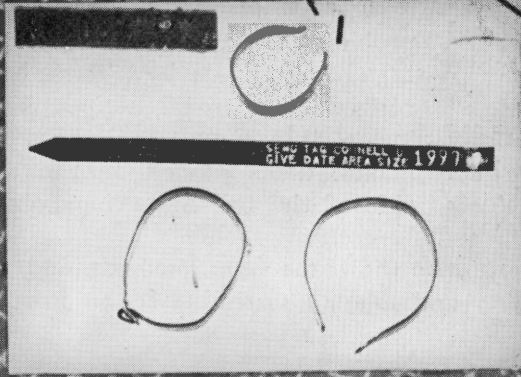
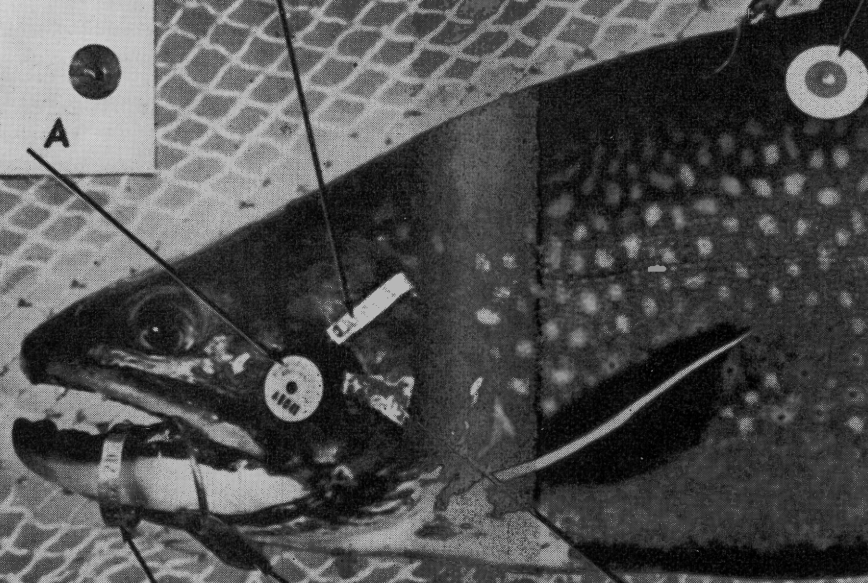
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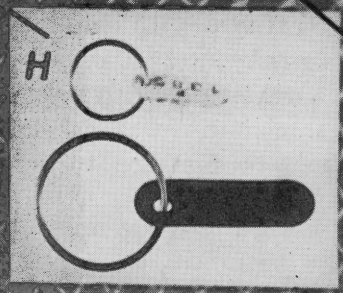
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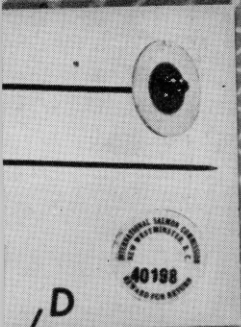
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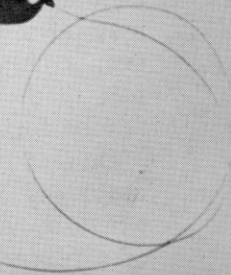
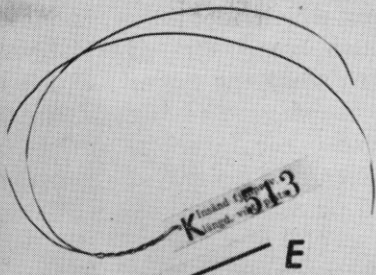
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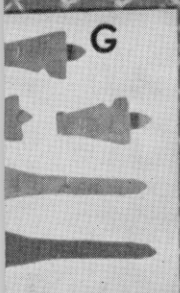
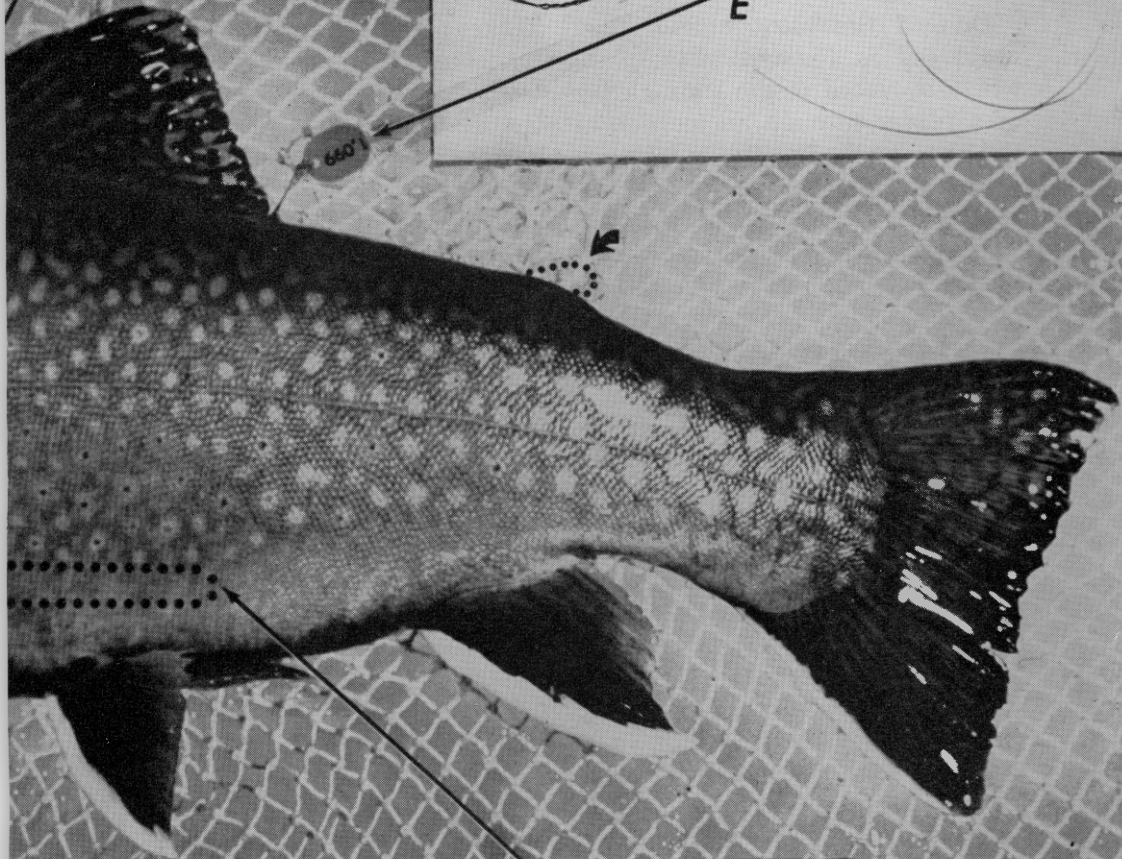
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FISH & GAME
MILLTOWN, N.J.



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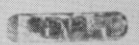
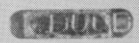
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WASHINGTON, D. C.

STATE WHEN AND WHERE CAUGHT OR WHEN
AND FROM WHOM PURCHASED. MEASURE FISH
BY TRACING ITS OUTLINE CAREFULLY ON PAPER.
SEND ABOUT 20 SCALES FROM EACH SIDE OF FISH

TEL. 18094
WASHINGTON, D. C.

Return to State Board of Fisheries
and Game, Hartford, Conn.

f



. . . Why Tag

on the body. Most tags have a number on them which identifies the fish, and also some sort of instructions as to what the finder should do with the tag. The tag may also request other information, such as length and weight of fish, method and place of capture, and so forth.

One of the most unique tags developed is a small metal plate which is placed in the body cavity of sardines through an incision in the body wall. The fish is then released and the incision soon heals, sealing the metal inside the fish. These marked fish are recovered by magnets which are placed over conveyor belts in canneries where the sardines are processed.

Fin Clipping

As the name implies, fin clipping consists merely of cutting off one or more of the fish's fins. Many studies have shown that the removal of a fin does not seriously handicap the fish, which soon learns to get along quite well without it.

Fin clipping has several disadvantages as compared with tagging. First of all, individual fish cannot be identified. A tagged fish has its own serial number and, if and when the fish is recovered, it can positively be identified as the same fish. A fin-clipped fish, on the other hand, can only be identified with a certain group of fish and not as an individual. For example, suppose one thousand bass are stocked in a pond and each one

has its left pectoral fin removed. If one of these fish is recovered a year later, it will be known that it is one of the thousand fish stocked last year, but it will not be known which one of those thousand fish.

Another problem which often arises with fin-clipped fish is regeneration. If care is not taken to cut the fin very close to the body, the fish simply grows a new one. This is especially true of the dorsal fin. Experiments have shown, however, that if a fin is amputated and the wound is then cauterized with a hot wire, there is very little chance of the fin growing back.

Still another disadvantage of fin clipping is that no return address or instructions can accompany a fish which has been marked in this way. Biologists can often count on fishermen to assist in gathering data on tagged fish, but they usually have to rely on some other method of recovering fin-clipped fish. A missing fin can easily go unnoticed by the angler, and if he does see it, he often will not realize its significance or will not know where to report it. Therefore, a biologist working with fin-clipped fish has to recover the fish himself by netting or other sampling.

On the other side of the ledger, fin-clipping is less expensive and much faster than tagging, and is quite adequate for certain types of investigations.

Why

Now that we have seen some of the ways in which fish are marked, let us find out *why* fisheries scientists run around placing pieces

of metal inside of fish, cutting off their fins, and hanging bits of plastic on them. As mentioned earlier, the sole purpose of any marking technique is the recognition of the fish when it is seen again weeks, months, or years later.

But why does the biologist want to recognize the fish when he sees it again? Basically he wants to know the answer to one or more of the following questions: How much has the fish grown since it was marked? Where has the fish travelled to by the time it was recaptured? How many of his marked friends were caught and how many were not? At what time of year was the fish caught? With the answers to these and other questions the biologist can piece together the solution to the problem on which he is working.

An excellent example of the importance of marking fish is the Lake Hopatcong Trout Research Program conducted from 1954 through 1959 by the New Jersey Division of Fish and Game, in cooperation with the Knee Deep Hunting and Fishing Club. This program was designed to find out whether or not trout could successfully be stocked in Lake Hopatcong and if so, what species and what size fish to stock.

Large numbers of trout were tagged and released in the lake during the five-year investigation. Due to the fine cooperation of anglers in returning tags, a great deal of data were collected which enabled the Division to develop a

successful trout fishery, not only at Hopatcong, but in other similar waters. Tag returns not only showed a good harvest and growth of these trout, they also revealed when the fish were being caught. Thus, it became apparent that there was a place and a need in the fishery for brook, rainbow, and brown trout. The brook trout form a large percentage of the catch



Tagged fish may be recognized

during the first few weeks of the season. A little later, with rising water temperatures, the rainbows become more active and contribute to the harvest; they also create a mild stir in autumn. The brown trout are taken in late May and early June, and also are important because they form the bulk of the holdovers (fish caught one or more years from date of stocking) at which time their weight increase may be 10 or 12 fold.

In addition to the above information, the tagging experiments indi-

. . . Why Tag

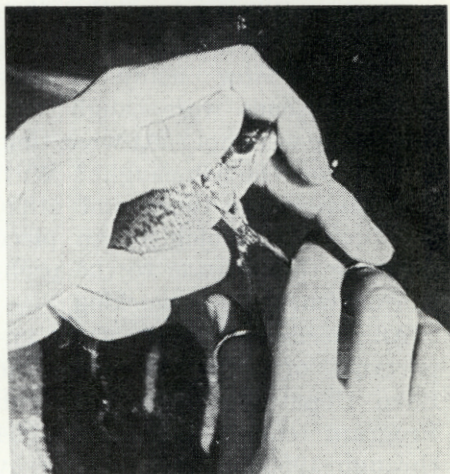
cated the optimum size and best time of year for stocking each of the three species.

Trout tagging studies have also been initiated on a few of our major streams. These studies also included periodic sampling of the areas where tagged fish had been released with electro-fishing equipment. From these studies we have been able to establish that most of the upper tidal portions of our coastal streams offer an excellent potential for trout fishing. We have also observed the territorial instincts of stream fish—especially brown trout. Some of these “established” browns can still be found in their home pools even after the following season has started.

Another tagging program in New Jersey is the one being conducted with fluke and porgies (scup) at the Marine Laboratory at Island Beach. This program is designed to reveal annual movements and racial tendencies among these fish and is in cooperation with the State of New York and the U.S. Fish and Wildlife Service. This information then will be used in the preparation of sounder management programs for these two important species. Several years ago personnel from the Marine Laboratory participated in a coast-wide striped bass tagging program. While information from this study is still coming in, it has already provided marine scientists with valuable information.

In the early 1950's, Division

personnel wished to evaluate the survival of hatchery-reared fingerling largemouth bass when stocked in various waters throughout the state. Thousands of fingerling bass were fin-clipped and released in over 30 impoundments up to 85 acres in area. The bass were stocked at various times of the year; often several stockings were made over a period of several years, necessitating the marking of different fins. Most of the im-



Fin-clipped fish may be identified

poundments then were drained after periods ranging from several months to three years. Controls at the hatchery and in farm fishponds had shown that a fin-clipped fish could still be identified after such a long period, also that there was no excessive mortality from the fin-clipping.

When these lakes were drained, care was taken to capture all of the fish and all bass were carefully examined for a clipped fin. From

these extensive studies, it was concluded that when fingerling largemouth bass are stocked in lakes where there is adequate bass reproduction, little or no survival of the hatchery fish can be expected. On the other hand, fair to good survival can be expected where there is no reproduction present, and excellent survival should be achieved from bass released into reclaimed waters. Thus, hatchery fingerling bass are now placed in waters where evidence has shown they will have a good chance for survival.

Still another type of study in which marking is an invaluable tool is the estimation of the size of fish populations. Suppose 500 largemouth bass are captured, fin-clipped, and released in a lake. Then, a few months later, another sample of 500 fish is collected from the same lake. If 100 fish from the second sample are found to be fin-clipped, we conclude that the ratio of fin-clipped to non-fin-clipped fish in the lake is found. Since we know that the total number of fin-clipped bass is 500, we can calculate that the entire population consists of about 2,500 fish.

It is not quite as easy as it sounds though, because certain requirements must be met before this system will work accurately. First of all, the marked fish must distribute themselves evenly throughout the entire population before the second sample is taken. Secondly, the mortality rate among marked and unmarked fish must be equal. Finally, the marked and

unmarked fish must be equally susceptible to capture by whatever method is used for sampling. It goes without saying, of course, that the marked fish must retain their mark.

Summary

To sum up, marking is not the answer to all of our fisheries problems, but it is an extremely useful method of gathering certain types of information. The biologist must first decide exactly what information he needs and whether or not marking is the best way to get that information. If he does decide to mark fish, he must then decide what type of marking system to use, taking into consideration the species of fish involved, the length of time he wants the mark to remain on the fish, and the personnel available to do the marking. Finally, he must decide how the marked fish are going to be recovered and how many fish will have to be marked to suit his purposes. Then, and only then, is he ready to begin marking fish.

One final word: HELP! That's right, *you* can help to make these marking programs a success if you catch a tagged fish. Don't throw the tag away or toss it in your tackle box and forget about it. Send the tag along with the length and weight of the fish and date and place of capture to the address which appears on the tag. Your cooperation will be greatly appreciated and you will be doing yourself a service by helping to improve fishing. #



CHUCK

By JOE LINDUSKA

COME THE heat and drought of late summer, he dozes in the cool confines of his burrow. That's estivation—of a sort. The winter he spends in deep sleep. That's hibernation. And on his own day in February he reveals the nature of spring weather to follow. That's long-range prognostication.

But the ground hog's more than a prize sleeper and prophet. He's a liability and an asset, nuisance vermin and prized game, a builder of homes for indigent rabbits and a razer of homes for indignant vacationers.

First off, he's a top-flight engineer and a soils expert of no small skill. It's not often you'll find a drowned-out woodchuck den. They pick their sites carefully—well-drained sidehills with a view. And where they have a choice, they select their soil type with even greater wizardry. A survey of woodchuck excavations showed they were unerring in the selection of sandy loam. The accuracy of their judgment in this department was short of amazing since the area was a patchwork of soil types.

After deciding on the place, time is no problem to a woodchuck. He has all summer and digs a little now and again as his mood moves

him. Some are shiftless and settle for basement apartments of utility size with a single opening. Others are like folks converting old barns. They add a room here and a door there with the result that some deep-down dwellings are elaborate affairs. One excavated den had over 56 feet of tunnel and five entrances. Some go down over six feet but the average maximum depth is nearer four feet.

A little super structure appears desirable with the result that brushpiles are favorite spots for a tunnel entrance. Abandoned buildings the same. And summer cottages frequently turn up with adjoining basements that weren't in the plans.

Like country folks in summertime, the woodchuck has lots of company, too—except his come in the dead of winter. Skunks, opossums, and rabbits aplenty all drop in. But the proprietor doesn't mind—in fact, he doesn't even know they're there. He's in deep sleep in private quarters sealed off from the den proper. His normally rapid heart beat (up to 200 per minute) is slowed to a chug—chug of four to five beats per minute. And his body temperature is reduced, too, from a normal 37°C. to eight. It

all tends to conserve energy during the long six-months sleep and abstinence from food.

Dig out a woodchuck den in winter and you're likely to find most anything—anything, that is, except the owner and regular tenant. The hibernating cell is so skillfully sealed off that it's seldom you can spot it from the main tunnel. But skunks you'll find, sometimes a dozen or more, huddled together in deep sleep. Mostly they're all females.

Rabbits, too, will take to "holing-up" in rough weather. In a study made to determine the extent of den use by cottontails, ferrets were run through 181 woodchuck burrows and rabbit occupancy was correlated with temperatures.

In spring—even early February in some places—ground hogs begin to surface. They breed soon after emerging from dens and 31 to 33 days later, they have four to six young 'uns. They eat, and lie in the sun, and eat and eat.

They're not what you'd call fussy eaters and will try most anything green. Alfalfa, clover, dandelions, and **my** cantaloupes are favorite foods. Most any garden vegetable suits them fine—even onions.

For a burrowing critter that spends more than half his life underground you might expect him to be ungainly on the ground. He's not. Like the overweight executive type, his gait's a little ambling. But he can make good time under pressure. And he can shinny up trees and do a fair job

of swimming. I've seen them—of all places—sitting on a fence post. And this summer we thought we had a beaver in one of our duck ponds. It turned out to be a well-larded 'chuck leisurely paddling across the ten-acre pool.

More than any other animal, the ground hog has led to the development of that special breed of rifleman—the "varminter." In advanced classes of this select school the challenge lies not in numbers bagged but in 'chuck to rifle distance. The result is stalking in reverse.

Upon spotting his quarry, the purist walks or drives *away* from it until it all but fades from the naked eye. Then he hauls it back up with a ten-power scope, and with sandbags and careful reckoning of wind, trajectory and other variables he squeezes, hoping for that shot he'll remember. First it's 400 yards, then 450—500—.

On a first exposure to the sport, mine came last spring, 550 yards if a foot. For a week I was elated. Then questioning glances forced an exact measurement. Well, it was still enough to add a convert to the cult. #



CANNED

By BETTYE BREESER

Photographs by the Author

IN SPITE OF ALL the fancy fishing plugs, trick bait, and live minnows that freshwater anglers choose to use, never is there a fishing haunt that doesn't show the remains of "canned" fishing habits. Why tomato cans seem to be the choice container is a mystery, but out of every dozen discarded cans it seems that the majority at one time served as a receptacle for the red skinned vegetable.

Littering the countryside is one of the grave sins of some fishermen, who, through thoughtlessness or lack of education on good outdoor manners fail to pick up their equipment completely. And, since worm bait seems to travel to fish-

ing sites via cans, the rusting remains were at one time important equipment—at least so at the start of the trip.

The art of worm digging isn't always easy as some might believe who have read tales of Huck Finn and Tom Sawyer in their youth. There are days when the coy segmented wigglers can be as evasive as a greased pig, and that, of course, is the very time when one finds free to fish. Worms can neither see nor hear, we are told, but they do have brains!

How worms have the ability to be so spade-shy is quite a mystery, when all a hungry robin has to do is to scamper over a lawn, tilt

If a choice were given, this worm would no doubt prefer to be a robin's dinner rather than a waiting morsel for a fish



There are days
when the coy
segmented wigglers
can be as evasive
as a greased pig



his head and strike with speed in the ground to pull up a good sized tidbit. Unfortunately man does not have the agility, nor the hearing, to go through such contortions, and since the spade is his tool, birds must chuckle in their beaks at his frantic digging. It is quite fortunate that the birds do not repeat, parrot fashion, the angry words of a fisherman who digs without success for worms!

No worm that has ever experienced a fish hook has revealed its reactions. A few do escape watery death, however, and perhaps these frightened few bore and push into sweet cool darkness again to tell tales of their "canned" tour of the earth above. The heat of a can,

whether it be a tomato container or any of the many possible varieties, must certainly be the main complaint of any unfortunate bait. Threading on a hook soon ends in watery numbness, but their hours in drying earth warmed by the sun must be murder for worms. If a choice were given they would no doubt prefer to be a robin's quick dinner rather than a waiting morsel for a fish.

As humans we marvel at the fact that when trout, bluegills, perch, and bass are biting, the worms are alerted by some strange signal and seem to dive to deep depths in the earth. What is this system that says "lie low?" There are times, we acknowledge, when worm dig-

. . . *Canned*

ging isn't too bad, and that must be when the population underground is at its height and all thoughts of safety forgotten.

Feeding on decaying vegetable matter, their burrowing and chewing activities delight agriculturists for worms are credited with making soil porous as well as building up top soil with their castings. Naturalists explain that the old saying that worms "rain down" after a shower is false, since the half-dead, water soaked critters simply crawl out of the ground for oxygen when the rain has filled their openings in the soil. The dying condition is due to the cold and light on their tender skins, not from a tumble from the sky. Seems like such a sneaky trick when sportsmen plod at night for crawlers. If there is any transparency at all in the earth, these wigglers must wonder at the small circle of light that moves from place to place in the grass. Night crawlers, being blind, should not be annoyed by flashlight beams, but they do seem to sense the light and zip for their burrows. Their confinement in a can must be a grueling experience. Fat and meaty, their full length cannot be attained in a confined area and it must be rather alarming to them to find

themselves tangled and interwoven with many others in a mat of slimy movement. Adventures in the cool dew dripping grass at night were never like "canned" living!

There are many artificial tricks to harvesting a worm catch for a day's fresh water angling. Seems that a warm bucket of detergent water thrown on the ground will hustle the cylindrical bodies to the surface in most any season. Others have found that burying garbage in a garden patch has its rewards, for around these moist areas can be found bait foraging for the decaying vegetable diet. Worms will remain alive in containers kept cool and moist with moss and leaves, but as to their comfort one has never yet preferred this to his home in the ground. Moist coffee grounds are often offered as an added attraction to these confined worms, but whether they enjoy the remains of yesterday's coffee is a question!

Acknowledging the fact that many sportsmen prefer worm bait, it is entirely proper to suggest that they think kindly of their harbored ground loving crawlers. Small helpless things that they are, they cannot pick up their tin can prisons and remove them from the water's edge. Perhaps in their spade-dodging acts they say—"I think I CAN." #

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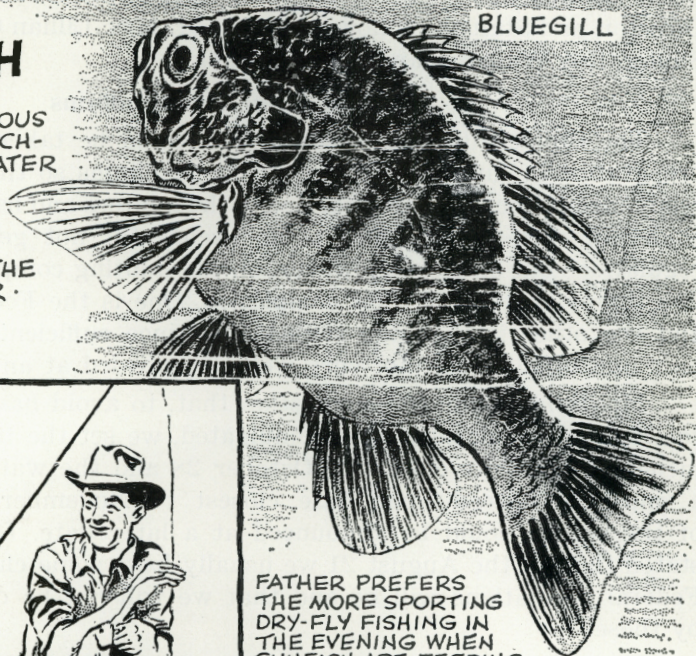
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Fur, Fin ^{and} Campfire

By JACK SORDS

SUNFISH

ANY OF NUMEROUS AMERICAN PERCH-LIKE FRESH-WATER FISH AMONG WHICH THE PUMPKINSEED, BLUEGILL AND CRAPPIE ARE THE MOST POPULAR.



BLUEGILL



THE SUNFISH IS A FAVORITE WITH THE WHOLE FAMILY BUT ESPECIALLY WITH JUNIOR WHO CAN HOOK HIM IN SMALL PONDS WITH WORMS FOR BAIT

FATHER PREFERS THE MORE SPORTING DRY-FLY FISHING IN THE EVENING WHEN SUNFISH ARE FEEDING ON THE SURFACE



Sunfish may be taken on hook and line at all times of the year in all waters

COUNCIL HIGHLIGHTS

MAY MEETING

The open session of the regular monthly meeting of the Fish and Game Council was held in Trenton on May 9. In addition to the Council, Director, and Staff the following attended: Mrs. Lillian Godown, Edmond Shuler, Roy Williams, and John Russack.

Fish and Game Compendiums

The Council discussed action that could be taken to expedite the preparation of hunting and fishing compendiums so that they would be ready in sufficient time to be of use to the hunters and fishermen. Director Underhill stated that there is no excuse for not getting the fishing regulations out on time. However, on the hunting compendium there are two things that delay their completion. One is the Federal regulations, and the other is the code regulations since sufficiently accurate data on game supplies can not very well be provided at an earlier date.

Mr. Heide made the suggestion that, to avoid having to wait until the Federal regulations are promulgated, we set the brant season commencing on a date closest to October 28 and the waterfowl season on a mutually agreed upon date closest to November 15. The length of the season could be announced at a later date. Director Underhill stated that by the August 21 we usually have some clue as to what the Federal regulations will be and that we will not be delayed too much by these.

Councilman Kelly asked that the names of all Bureau Chiefs, and their addresses and telephone numbers, be listed on both the fishing and hunting compendium.

Delaware Bay Rule

Mr. Lunsford, Chairman of the Marine Fisheries Committee, stated that it was the recommendation of his Committee that the present lift period on shad nets in Delaware Bay commencing at 2:00 p.m. on Saturday, served no useful conservation purpose and it does endanger the life, limb, and property of many persons. The Committee recommended that the Council sponsor proper legislation to abolish this lift period. A motion was made by Councilman Onkst, seconded by Councilman Frome, that the Committee recommendation be accepted and that legislation, taking effect immediately, be prepared to do away with the lift period in Delaware Bay. This motion passed unanimously.

Rabbit Management

Councilman McNeel stated that in Chief MacNamara's report to the Ways and Means Committee on expansion of Division activities, Mr.

MacNamara recommended the establishment of a new rabbit management program. Mr. McNeel stated that we have done a fairly good job in convincing many sportsmen that the importation and stocking of rabbits is a waste of money and does not accomplish anything. On the other hand he states we have done nothing to set up a program whereby the sportsmen can help themselves, and he recommended that a committee of the Council be established to work with the Game Management Bureau in studying Chief MacNamara's recommendations, investigating what other states are doing, and eventually making recommendations to the Council. Councilman Frome suggested that the Soil Conservation Service could perhaps help in such a program.

The whole Council voted in favor of Mr. McNeel's recommendation and the Chairman appointed the following committee to set up a rabbit management program: Councilman McNeel, Chairman, Councilman Frome, Councilman Onkst, and Councilman Kelly.

Director Underhill stated that he agreed with the desirability of forming this committee and that it can be helpful, but disagreed that the Division had done nothing. Monthly and annual reports will show that in the past 10 or 15 years there has been considerable progress in establishing habitat primarily for rabbits. Councilman McNeel felt that he needs a little more education on this himself and perhaps the sportsmen feel the same way.

Slides and Films

Director Underhill stated that he has made some shifts in public relations personnel. Harry Grosch is on Green Acres Program making a series of slides and movies illustrating these programs which can be duplicated and made available to Conservation Officers and others. They also could be made available to groups without a speaker. These pictures will cover all outdoor recreation including wetlands and farm game.

Chairman McCormick stated that he would like to see a film done on the Division's habitat work. Director Underhill added that he would like to see the states pool their resources as far as films are concerned.

Wildlife Management

Chief McNamara reported that the game farms are coming along nicely. Also everything has been set up for state 4-H chick distribution within budget limitations. There has been considerable cooperation carried on with mosquito control agencies throughout the state.

Regarding wild turkeys, Chief MacNamara reported that his men went to Pennsylvania to pick up 20 hens and 6 gobblers which were furnished to this state through the Director's contact with Director Golden of the Pennsylvania Game Commission. These birds were to be

. . . Council Highlights

liberated on the Wharton Tract. They are semi-domesticated wild turkeys. Chairman McCormick reported that wild turkeys seem to be holding up despite extremely adverse weather conditions this winter.

Plans and figures for rewiring at Forked River have been received from the power company. They have set up a recommendation which will save the Division \$200.00 a year and possibly more. Mr. MacNamara feels it would be better to postpone the installation there as we are making a generator hookup at the Quail Farm, and getting that experience. Then sometime this winter we can make the installation at Forked River and probably save \$1,000.00 if we give the power company assurance that we will make the suggested change. It seems logical to give them this assurance. Councilman Onkst made a motion that this change be made. This was seconded by Councilman Heide. All favored and the motion carried.

Councilman Kelly Reports

On his trip to the National Watershed Conference in Tucson, Arizona, Mr. Kelly reported that he had spent two very informative days on field trips with Director Smith of the Division of Fish and Game in Arizona. He was also particularly interested in their electro-fishing gear.

Mr. Kelly also reported that he had made the first lake shocking trip with Division biologists and the equipment worked very well in spite of some handicaps. #

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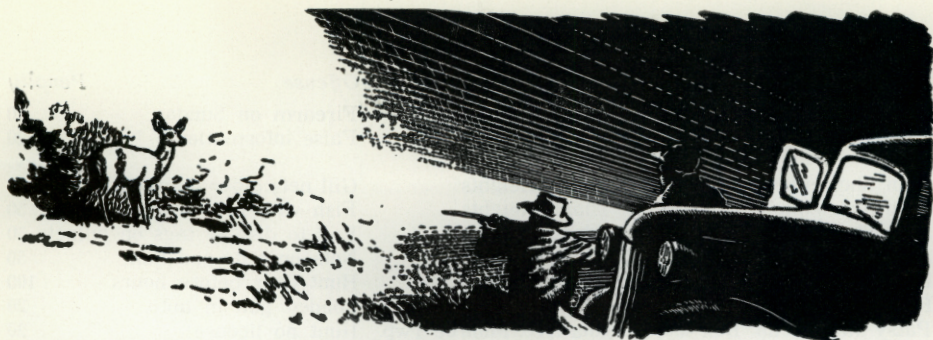
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VIIOLATORS ROUNDUP

MARCH 1961

<i>Defendant</i>	<i>Offense</i>	<i>Penalty</i>
David C. Haggerty, 201 Miller St., Hackettstown	Loaded gun in auto	20
David C. Haggerty, 201 Miller St., Hackettstown	Fish no license	20
Curtis F. Gerhart, 57 Tatum St., Mantua	Kill protected bird	20
John L. Oliva, 308 S. 7th St., Hammontong	Hunt deer at night	100
John L. Oliva, 308 S. 7th St., Hammontong	Hunt aid of lights	20
John L. Oliva, 308 S. 7th St., Hammontong	Hunt on Sunday	20
Jos. A. Giannini, Egg Harbor Rd., Blue Anchor	Kill deer closed season	100
Jos. A. Giannini, Egg Harbor Rd., Blue Anchor	Hunt deer at night	100
Jos. A. Giannini, Egg Harbor Rd., Blue Anchor	Hunt aid of lights	20
Jos. A. Giannini, Egg Harbor Rd., Blue Anchor	Hunt on Sunday	20
Thomas W. Logan, 342 Poplar Ave., Westville Grove	Loaded gun in auto	20
Thomas W. Logan, 342 Poplar Ave., Westville Grove	Illegal firearm	20
Thomas W. Logan, 342 Poplar Ave., Westville Grove	Hunt game with vehicle	20
David W. Gart, 10 Denz Rd., Brick Town	Illegal poss. duck	20
Fredrick P. Beaver, 38 E. Fredrick Ave., Maple Shade	Illegal firearm	20
Fredrick P. Beaver, 38 E. Fredrick Ave., Maple Shade	Hunt game with vehicle	20
Fredrick P. Beaver, 38 E. Fredrick Ave., Maple Shade	Loaded gun in auto	20
Gregory Shikitino, Woodland Ave., Westville Grove	Hunt game with vehicle	20
Gregory Shikitino, Woodland Ave., Westville Grove	Loaded gun in auto	20
James E. Beaver, 541 Lester Terr., Camden	Loaded gun in auto	20
James E. Beaver, 541 Lester Terr., Camden	Hunt game with vehicle	20
James E. Beaver, 541 Lester Terr., Camden	Illegal firearm	20
Bruce Smith, 441 So. Green St., Tuckerton	Illegal missile	100
Bruce Smith, 441 So. Green St., Tuckerton	Loaded gun in auto	20
Bruce Smith, 441 So. Green St., Tuckerton	Hunt deer at night	100
Herbert Errickson, Box 67, Belleplain Rd., Delmont	Kill a doe deer	100
George S. Battles, Jr., Sandy Pines Trailer Pk., Absecon	Fail to report deer	100
John Esposito, 80 Lindsay Ave., Runnemede	Kill squirrel closed season	20
Meade E. White, 1001 N. Copley Pl., Haddonfield	Kill squirrel closed season	20
Robert DuBois, 103 Laurel Heights, Bridgeton	Illegal poss. deer	100
Larry Riley, 100 Laurel Heights Dr., Bridgeton	Illegal poss. deer	100
Walter E. Baker, Jr., 32 Main St., Dividing Creek	Hunt no license	20
Martin L. Shipe, 121 W. 28th St., Bayonne	Fish no license	20
Anthony Secula, Box 149, Landing	Loaded gun in auto	20
Gene Secula, Howard Blvd., Mt. Arlington	Loaded gun in auto	20
Domenick Bartolini, 1551 Chambers St., Trenton	Illegal missile	100
Peter R. Owens, 239 Academy St., Hightstown	Loaded gun in auto	20

. . . Violators Roundup

<i>Defendant</i>	<i>Offense</i>	<i>Penalty</i>
Thos. J. Mawn, 342 Allenhurst Ave., Ridgeway, Pa.	Firearm on Sunday	20
Stanley Platt, Five Cross Rd., Clementon	False information	20
		Lic. Rev.
John Shertenlieb, W. Ray St., Island Heights	Gill nets other than Atl. Ocean	50
John Shertenlieb, W. Ray St., Island Heights	Fish with nets without lic.	50
John Shertenlieb, W. Ray St., Island Heights	Fail to display tags on gillnets	50
John Shertenlieb, W. Ray St., Island Heights	Nets on Sat. and Sun.	50
Ray E. Morgan, 62 Forless Ave., Old Bridge	Hunt deer before hours	100
Ray E. Morgan, 62 Forless Ave., Old Bridge	Loaded gun in auto	20
Patsy Mascarella, Box 450, Pergola Ave. Monroe Twp.	Hunt no license	20
Patsy Mascarella, Box 450, Pergola Ave. Monroe Twp.	Loaded gun in auto	20
Patsy Mascarella, Box 450, Pergola Ave. Monroe Twp.	Hunt aid of lights	20
John Cipriano, Old Black Horse Pk., Blackwood	Poss. duck closed season	20
Alfonse Masucci, 94 Magnolia St., Belleville	Loaded gun in auto	20
Thomas Accomando, 90 Magnolia St., Belleville	Loaded gun in auto	20
Patsy Mascarella, Box 450, Pergola Ave., Monroe Twp.	Hunt deer with rifle	20
Patsy Mascarella, Box 450, Pergola Ave., Monroe Twp.	Hunt deer after hours	100
Ray E. Morgan, 62 Farless Ave., Old Bridge	Illegal missile	100
Ray E. Morgan, 62 Farless Ave., Old Bridge	Hunt no license	20
Ray E. Morgan, 62 Farless Ave., Old Bridge	Hunt aid of lights	20
Donald Pye, Red Bank & Hessian Ave., Thorofare	Illegal poss. 2 deer	100
Walter Thompson, 51 Main St., Dividing Creek	Dump refuse on State land	10
Joseph T. Lockwood, Jones Mill Rd., Chatsworth	Hunt deer closed season	100
Joseph T. Lockwood, Jones Mill Rd., Chatsworth	Illegal poss. deer	100
Joseph T. Lockwood, Jones Mill Rd., Chatsworth	Illegal poss. deer	100
Richard Mailot, 115 Mt. Prospect Ave., Newark	Hunt no license	20
Charles R. Mathis, R.D. 2, Box 84, Woodbine	Hunt deer after hours	100
Charles R. Mathis, R.D. 2, Box 84, Woodbine	Hunt deer closed season	100
Charles R. Mathis, R.D. 2, Box 84, Woodbine	Hunt no license	20
Elmer Phillips, R.D. 1, Parvins Mill Rd., Elmer	Fish no license	20
Devoe Denton Rathbone, Rt. 2, Waynesville, N. C.	Hunt no license	20
Robt. Anderson, 1 Dogwood Lane, Rumson	Loaded gun in auto	20
Edward Porskivies, Ward Lane, Rumson	Loaded gun in auto	20
Gerald Ciser, Lakeside Ave., Rumson	Loaded gun in auto	20
Barron Thompson, Jr., 424 Erico Ave., Elizabeth	Kill illegal deer	100
Sgt. Hollis Buck, 1st Army Marksman Unit, Fort Dix	Illegal missile	100
George Mason, 1st Army Marksman Unit, Fort Dix	Attempt take deer closed season	100
David Pettit, 203 Broad St., Elmer	Fish no license	20
Ralph Charlton, Jr., 360 N. Laurel St., Bridgeton	Hunt no license	20
Ralph Charlton, Jr., 360 N. Laurel St., Bridgeton	Loaded gun in auto	20
Ralph Charlton, Jr., 360 N. Laurel St., Bridgeton	Uncased gun	100
Craig Ritchie, High St., Leesburg	Gun on Sunday	20
Clyde Marty McAfee, Lakehurst Rd., Browns Mills	Discharge firearm near occupied dwelling	20
Raymond Pinkos, 83 Richard St., N. Brunswick	Tag not displayed	5
Theodore Machinski, 407 Post Ave., Lyndhurst	Gun on Sunday	20
Jack Santulli, 339 Valleybrook Ave., Lyndhurst	Gun on Sunday	20
James Tamasi, 58 Dorann Ave., Princeton	Negligent use of gun	10
		Lic. Rev.
Paul M. Dixon, Belleplane R.D., Woodbine	Uncased firearm	100
Paul M. Dixon, Belleplane R.D., Woodbine	Fail to exhibit license	20
Paul M. Dixon, Belleplane R.D., Woodbine	Hunt aid of lights	20
Andrew Konyak, 49 Pine St., Wharton	Attempt take fish with tip up	20
Edward Lindner, 4 Brookside Way, Morristown	Hunt no license	20



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