



## Rural Retreat Lake Fisheries Management Report May 2004



Rural Retreat Lake is a 90-acre lake in southwestern Wythe County. Built in 1969 by the Virginia Department of Game and Inland Fisheries (VDGIF), the lake offers something for everyone in the family! VDGIF manages the lake for fishing. Wythe County Parks and Recreation Department runs a campground, swimming pool, picnic area, boat rentals, and a concession that sells bait, tackle, and food. Between October 1 and June 15, visitors with a trout stamp can fish a 2-acre pond next to the lake for trout.

During its early years, the lake was managed as a bass, bluegill, channel catfish, and muskellunge (musky) fishery. In 1978, the lake was drained to repair the dam and the lake's drain. In 1981, the lake was restocked with largemouth bass, bluegill, redear sunfish, and channel catfish. During the time the lake was drawn down for repairs, someone (other than VDGIF) stocked black crappie in the lake. These fish quickly overpopulated the lake and, until recently, were small and slow growing. In 1985, muskellunge (also called musky) stockings were begun again, and these stockings continue today. Between 1997 and 1999, northern pike were stocked in high numbers to help control overabundant black crappie in the lake (Table 1).

Rural Retreat Lake has a small watershed (the land that drains into the lake), with about 23 acres of watershed for every acre of lake. As a comparison, a nearby flood control lake has about 223 acres of watershed for every acre of lake! Rural Retreat Lake was built with a small watershed so nutrients that run off the land upstream from the lake remain in the lake longer. The longer these nutrients stay in the lake, the more pounds of fish the lake will be able to produce. However, the amount of nutrients reaching the lake can cause problems if they are coming in faster than the lake's animals and plants can process them. Too many nutrients can cause excess algae and aquatic plant growth. Nutrients are just one factor that control how good the fishing is in Rural Retreat Lake. The length of the growing season and the number of fish in the lake determine how fast fish will grow. Fish in mountainous areas of Virginia (like Wythe County) grow more slowly than fish in the Piedmont and Coastal Plain areas of the state. Fish populations with high numbers grow more slowly than fish populations with lower numbers.

The following are VDGIF's fish management objectives for the lake:

- (1) We will maintain the largemouth bass and bluegill populations in the lake in a state of "balance". "Balance" refers to the relative state of stability between the largemouth bass as predator and the bluegill as prey.
- (2) We will monitor the black crappie population to see if northern pike stockings and increased angler harvest have corrected the stunted population.
- (3) We will maintain muskellunge and channel catfish fisheries in the lake through regular stocking of these species.

How do biologists sample the lake's fish population?

### **Trap Nets**

When VDGIF fisheries biologists sample fish populations in Rural Retreat Lake, they use sampling techniques to examine the sizes and health of different types of fish. To sample black crappie, they often use "trap nets". These nets have a short lead net at one end that is anchored on the shoreline. Fish migrating along the shoreline of the lake encounter this lead net and try to swim out into the lake to get around it. As they do so, they encounter an underwater cage structure (the working portion of the trap net). When fish enter the cage, they enter a maze of small openings that guide them to swim farther into the net. The fish eventually reach a point where they can no longer turn around and come back out. At this point, they are officially "live trapped" and biologists can take them out of the nets, measure their lengths and weights, and remove some of them for age and growth analysis. Trap nets are set for an overnight period in order to catch enough fish for a good sample. Trap nets are also good for trapping species like musky and bluegill.

### **Electrofishing**

"Electrofishing" is a fish collection technique that uses a boat-mounted generator and voltage regulator to put an electric shock into the water. The shock affects fish that swim near the boat's electric field, which is limited to an area within a few feet around the boat. "Electroshocked" fish actually swim towards metal booms dangling off the front of the boat, where they are temporarily stunned and can be netted by biologists. After measuring their lengths and weights, biologists return the "shocked fish" to the area where they were collected. This sampling technique is best for fish that live in shallow water along the lake's shoreline or ones that move into shallow waters during certain times of year (such as spring spawning season). Biologists use electrofishing to collect species like largemouth bass, bluegill, and black crappie.

What are those strange terms biologists use?

Scientists like to name things they observe in the natural world. Biologists have their own set of terms. Fisheries biologists talk about things like "size structure", "proportional stock density", "relative stock density", and "relative weight". What in the world do these terms mean? All of them refer to things that fisheries biologists measure on a regular basis.

### **Size Structure**

Size structure refers to the sizes and numbers of a particular fish in a lake, stream, or river. Biologists collect a sample of fish from that waterbody, measure them in metric units (the way all scientists measure things), and then use an index to describe the "size structure" of those fish. One index we all hear about on a daily basis is the "Consumer Price Index", which tells us how much inflation is occurring in our economy. Biologists have two favorite indices they use to determine whether there are good numbers of fish in a population. "Proportional Stock Density" and "Relative Stock Density" (called PSD and RSD for short) are two indices that biologists use to get all this information from a sample of a fish population that has been sorted by species and counted by sizes.

Proportional Stock Density (PSD) is the total number of fish over stock size (fish that are big enough to be caught by anglers) that are also over a size considered to be “quality size” by most anglers. The length of these “stock” and “quality” size fish changes with different species of fish. For largemouth bass, PSD is the percentage of bass over 8 inches (stock size) that are also over 12 inches (quality size).

Relative Stock Density (RSD) measures the percentage of stock size fish that are over certain sizes called “preferred”, “memorable”, and “trophy”. These RSD sizes change with different fish species. For largemouth bass, “preferred” fish are 15 inches, “memorable” fish are 20 inches, and “trophy” fish are 25 inches.

PSD and RSD are neat indices because they also tell us whether enough reproduction, survival, and growth are occurring in a fish population. All three of these things ensure good fishing in the future. Healthy ranges for PSD and RSD change with different management goals for a population. In the tables of this report, I indicate whether the PSD and RSD values we have measured for different fish species in Rural Retreat Lake are in the proper ranges for the management objectives we have set for the lake.

### **Relative Weight**

Another term that biologists use frequently is called “relative weight”. When biologists sample a fish population, they often measure both the length and the weight of the fish collected. This information is used to see if those fish meet regional or national standard weights. Local biologists use these regional or national standards to check fish weights relative to the standard weight for a fish that length, which is why it is called “relative weight”. Individual fish “relative weights” in a lake are averaged and compared over time to see whether management practices are causing a desired change.

What is the current status of Rural Retreat Lake’s fish populations?

### **Largemouth Bass**

In 1993, in response to the lack of good sizes of largemouth bass in the lake (few bass over 12 inches), Department biologists passed an 18-inch largemouth bass size limit, with a creel limit of 1 per day. This new regulation shifted the largemouth bass population to a “balanced population”. Spring electrofishing samples since 1994 show that 26-42% of the largemouth bass over 8 inches are also over 12 inches in length. The proportion of largemouth bass over 8 inches that are also over 15 inches has ranged from 3-22% since 1994. The percentage of trophy-size largemouth bass in the lake has also increased. Spring electrofishing since 1995 indicates that up to 9% of the largemouth bass over 8 inches are also over 20 inches long. Electrofishing samples since 1998 also show that largemouth bass have better relative weights than they had in the past.

### **Bluegill**

The numbers, body condition, and growth rates of bluegill in Rural Retreat Lake depend on the proper number of predator fish (largemouth bass) being present to keep their numbers in check. Between 1990 and 1995, 20 to 30% of the bluegill greater than 3

inches long were also greater than 6 inches. Between 1996 and 2003, this percentage increased to 50 to 70%! Because the largemouth bass population has improved in the lake, they are eating more bluegill. The remaining bluegill grow to larger sizes. Bluegill relative weight has also improved since 1993, because there are fewer of them.

### **Black Crappie**

Ever since black crappie were stocked into Rural Retreat Lake, they have been overpopulated and slow growing. During spring 1996, biologists sampling the lake with electrofishing were catching as many as 300 crappie per hour of electrofishing time, a catch rate that is far higher than any lake in the state. By spring 2001, the black crappie electrofishing catch rate fell to about 100 per hour. During spring 2003, the black crappie electrofishing catch rate was 231 per hour, a sign that the population is growing again.

Between 1997 and 1999, we stocked large numbers of northern pike to eat crappie. At the same time, we advertised the lake as a good place to catch black crappie. Since 1998, the black crappie population has improved! Numbers of crappie in the lake and crappie over 8 inches long have increased. Black crappie collected in trap nets in March 1998 averaged 8 inches. In April 1999, their average size improved to 8 and ½ inches. Black crappie collected in trap nets during March 2004 averaged 9 inches (see Figure 4). Black crappie relative weight has also improved since 1995. Another good note about the crappie population is that we are now seeing improved survival of newly spawned fish. Between 1993 and 1997, the only year's spawn that existed in the lake were the crappie spawned in 1992. Biologists studying the lake found successful crappie spawning in 1997, 1998, 1999, 2000, and 2001. We will continue to monitor this population to avoid future stunting problems.

### **Muskellunge**

We have held our stocking rate steady at 50 muskellunge per year since 1989. This stocking rate has produced a good muskellunge fishery in the lake, based on reports we get from anglers. In 2003, anglers turned in 4 musky for angler awards (musky longer than 40 inches or over 15 pounds) from fish caught at Rural Retreat Lake. This number of certificate award fish matched the number caught from Burke Lake in Fairfax. However, acre for acre, Rural Retreat Lake produced more award fish, since it is only 1/3 the size of Burke Lake. The number of musky caught from Rural Retreat Lake will never match the numbers caught from the New or James Rivers. However, the continued stocking of these fish in the lake adds to the excitement of anglers visiting the lake, since they never know when one of these giants will take their lure.

### **Channel Catfish**

Before 2003, channel catfish were stocked every other year to build a consistent fishery in the lake. While we did not evaluate the population, we did observe some nice-sized catfish during spring electrofishing each year. In addition, we hear from anglers that nice catfish are caught from the lake. In 2003, following a Department study on survival of stocked channel catfish in small lakes, channel catfish stocking numbers were decreased to 10 per acre. However, these channel catfish were an average of 10 inches

long, which is much larger than the average size used in earlier stockings. Stocking larger channel catfish will result in a better population in the lake.

### **Northern Pike**

These fish are a relative newcomer to the Rural Retreat Lake scene. Many of the ones stocked in 1997 should be 26-30 inches long, so they will provide a nice fight on the end of your line! Northern pike have grown so well in Rural Retreat Lake, they are now being turned in for trophy angler certificates. In 2003, five trophy northern pike (over 30 inches or 6 pounds) were caught from the lake. The Department will stock additional northern pike this year to keep the crappie population thinned out.

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