

Lake Management Consultants  
Experts in  
Aquatic Vegetation Control

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**2008**

**FISH POPULATION SURVEY**

**PINES LAKE**

## **INTRODUCTION**

On October 1, 2008, a fish population survey was conducted on Pines Lake by Aquatic Technologies, Inc. The purpose of this survey was to collect data from the lake, identify problems with the lake and develop a management plan for the lake. Data that related to water quality and the fish population was collected.

## **MANAGEMENT GOAL**

Pines Lake has an established fish population that has reached the carrying capacity for the water body. Our goal is to manage the fish population to improve the largemouth bass population in addition to populations of other desirable species in the lake. Improvements are to be made in the growth rates, sizes, numbers and reproductive potential of each species. Water quality management is another concern that needs to be addressed and future management goals should be established.

## **FISH POPULATION MANAGEMENT**

Freshwater lakes have fish populations that are composed of two categories. They are classified as either a predator or forage fish. The predator fish feed on the forage fish. In a "balanced" population, predator fish will prevent the forage fish from overpopulating. Also, there are about three to four pounds of forage fish for every pound of predator fish in a "balanced" population. In most fish populations, the predator fish are removed much faster than the forage fish and the population quickly shifts to one that is "out of balance". Certain predator species work better with certain forage species. In general, a forage fish works well with a predator that shares the same habitat. The spawning period for the forage fish should be shortly after the spawning period for the predator. The reason for this delay is that the young of the year predators will have a supply of newly hatched forage fish that are small enough for the predators to eat. If the forage fish hatch before the predator, the forage is too large for the predator fish to eat when they hatch. A good example of this relationship is that of the largemouth bass and bluegill. Bluegills spawn after the largemouth bass, share the same habitat and provide good forage for the young of the year largemouth bass.

The first goal in the management of the fish population in any water body is to match the proper predator fish with the proper forage fish. Once this is accomplished, the object is to manage the forage fish population to produce large numbers of young fish on which the predators can feed. The predator fish must also be maintained in large enough numbers to prevent the forage fish from overpopulating. As the forage fish overpopulate, they exceed the carrying capacity of the ecosystem. As a result, their reproduction decreases and the fish population of the entire water body deteriorates.

## FISH POPULATION SURVEY METHOD

Fish populations were sampled using an electrofishing boat. The electrofishing boat is equipped with a 4000 watt VVP electrofishing unit, which was used to sample the lake for the larger fish of each species. Electrofishing took place along the shoreline and additional sampling was conducted around structures found throughout the lake.

## FISHES PRESENT

Common Name	Scientific Name
Largemouth Bass	<i>Micropterus salmoides</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Chain Pickerel	<i>Esox niger</i>
Northern Pike	<i>Esox lucius</i>
Bluegill	<i>Lepomis macrochirus</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Yellow Perch	<i>Perca flavescens</i>
Black Crappie	<i>Pomoxis nigromaculatus</i>
Brown Bullhead	<i>Ictalurus nebulosus</i>
White Perch	<i>Morone Americana</i>
Rock Bass	<i>Ambloplites rupestris</i>

### Largemouth Bass

The largemouth bass is one of the main predators in the fish population. The majority of this fish's diet is composed of smaller forage fish in the lake. It feeds well on small sunfish, golden shiners and other shoreline forage fish. The largemouth thrives best in shallow, weedy lakes or in river backwaters. Largemouth bass prefer weedy habitats not only because their food supply is available in those areas, but also because aquatic plants and sunken debris furnish protection. The largemouth bass population in Pines Lake is composed of a variety of sizes. Largemouth bass were sampled in almost every inch class up to 20 inches. Fish in the 14 to 17 inch ranges were found in good numbers (see figure 1). Reproduction from 2008 was good. These young bass were healthy and growing at a good rate. They ranged in size from 4 to 6 inches.

### Smallmouth Bass

The smallmouth bass is usually found in rocky locations in lakes and streams. They prefer clear, rocky lakes with a minimum depth of 25 to 30 feet and temperatures in the summer no less than 60°F and no more than 80°F. In streams, this bass prefers a good percentage of riffles flowing over gravel, boulders or bedrock. The first food for

smallmouth consists of minute crustaceans and later it graduates to insect larvae, crayfish and fish. While smallmouth bass can survive in Pines Lake, it does not provide the most desirable smallmouth bass habitat.

Only a few smallmouth bass were found during the survey. Most of these fish were in the 16 to 18 inch range. They appear to be healthy and growing at a good rate.

### **Chain Pickerel**

Chain pickerel are usually found where larger species of pike are either rare or absent. Chain pickerel grow rather quickly and can reach 14 inches in 3 years. It takes about 6 years to attain a length of 20 inches and if one survives to the maximum of 10 years, should be 36 inches long and weigh approximately 9 pounds. Chain pickerel sampled during the survey were a variety of sizes. Most of the chain pickerel found in the survey were 12 to 15 inches in length. These fish were sampled in low numbers during the survey. Low numbers of 2008 reproduction were sampled during the survey.

### **Northern Pike**

Northern pike are one of the fastest growing freshwater fish. Under ideal conditions they possess the ability of extremely rapid growth. Females grow much larger than males, which rarely exceed 24 inches. They are voracious feeders and will eat anything from fish to muskrats and birds. In the summer months, they are usually found in or near weed beds in about four feet of water. Several northern pike were sampled during the survey. They ranged in size from 29 to 36 inches in length.

### **Bluegill**

The bluegill is a species of sunfish that prefer quiet, weedy waters where they can hide and feed. In the daytime, the smaller fish are close to shore in coves and under docks. The larger bluegills prefer the adjacent deeper waters in the daytime but move into shallow areas in the morning and evening to feed. Bluegills also work well in a predator-prey relationship with largemouth bass. Bass feed well on this fish and they supply a large amount of food for the young of the year bass. Bluegills spawn after the bass, which gives the young of the year bass a good supply of food for growth their first year. Bluegills tend to spawn more often during the summer than pumpkinseeds, resulting in a larger food supply for the young bass. The bluegill population appears to very healthy and reproduction is very good. Large numbers of one to three inch bluegills were sampled along the shoreline. Three to four inch bluegills were found in lower than desired numbers. Most of the larger bluegills sampled during the survey were 6-9 inches.

### **Pumpkinseed**

The pumpkinseed is a species of sunfish that inhabits standing water with soft bottoms covered with sunken plant material. It prefers weed patches, docks and logs for cover, and is most often found in these locations. These sunfish are a species that work well in a predator-prey relationship with the largemouth bass. Bass feed well on these fish and

they supply an abundance of food for the young of the year bass. Pumpkinseeds spawn after the bass, which gives the young of the year bass a good supply of food for growth that first year. The pumpkinseed population appears to be very healthy with a good growth rate. The pumpkinseed population is comparable in size to that of the bluegill. Pumpkinseeds are reproducing at a high rate. One to three inch pumpkinseeds were sampled in large numbers during the survey at all locations along the shoreline. Most of the larger pumpkinseeds sampled during the survey were 6-8 inches.

### **Yellow Perch**

This is the most widely distributed member of the perch family. The perch is at home in small and large lakes alike, and though found in rivers it is considered primarily a lake fish. Lakes with cool, clean, water and ample amounts of sandy or rocky bottom make better perch lakes. The yellow perch works well as a forage fish with chain pickerel and walleye. They do not work as well with largemouth bass since they prefer a slightly different habitat. Yellow perch in a variety of sizes were sampled during the survey. Many perch were sampled in the 4 to 6 inch ranges and are overcrowded and stunted out.

### **Black Crappie**

The black crappie is a popular freshwater panfish found throughout the United States. The black crappie likes quiet waters and prefers more vegetated areas than the white crappie. The black crappie is strictly carnivorous, feeding on small fishes, aquatic insects, and crustaceans. Only a few small black crappies were sampled during the survey.

### **Brown Bullhead**

Brown bullheads are a medium size slender-bodied catfish. Bullheads are an omnivorous feeder and will feed on anything from plant material to fish. Being a bottom feeder, however, a major portion of its diet is composed of insect larvae and mollusks. Bullheads were present in survey, ranging in size from 8 to 11 inches. The population appears healthy and not a real concern in the management of the lake.

### **Rockbass**

One rockbass was sampled during the survey. This fish was 7 inches in length. Because of the low number sampled, they are not a real concern in the management of the lake.

### **White Perch**

The white perch is a member of the white bass family, not the perch family. White perch are native to saltwater, but spawn in freshwater. When white perch invade a freshwater lake they can create significant problems for the existing fish population. Being prolific spawners, they can create problems when their population is on the upswing. White perch have out competed and all but eliminated other more desirable fish species in

some lakes. While only a few white perch were sampled during the survey, they present a real concern for the future management of the fishery.

## **FISH MANAGEMENT PINES LAKE**

Results of the 2008 fish population survey indicate that the quality of the fish population in Pines Lake is in good condition when compared to similar lakes in the mid-Atlantic Region. There is good reproduction from the largemouth bass, indicating that there is available habitat for largemouth bass to successfully spawn. As you can see in figure 1, largemouth bass are found in a range of sizes from 4 to 19 inches. Largemouth bass are found in high numbers between the sizes of 15 and 17 inches. As figure 2 indicates, largemouth bass smaller than 15 inches are slightly above normal weight for their length when compared to the standard. Largemouth bass over 15 inches in size on average are under weight when compared to the standard.

Many one to three inch bluegills were sampled during the survey. This size bluegill is a size that is preferred by smaller bass. Largemouth bass over 15 inches prefer larger size forage, usually in the range of three to four inches. What the survey data is showing is that the largemouth bass are reproducing well. These young bass have a good supply of food and they grow well until they reach a size of 15 inches. At this size range, their growth rate slows because there is more competition for food. As a result, these larger bass slowly become under weight for their length.

In order to increase the size and weight of the older/larger largemouth bass, there needs to be less competition for the available bluegill forage. Since 17 inch bass don't like eating the smaller one to two inch bluegills, there needs to be an increase in the number of the more desirable three to four inch bluegills in the lake. Therefore, we need to remove those bass that are feeding on those one to two inch bluegills. What that means is that fishermen need to target and aggressively remove largemouth bass between 11 and 16 inches in length. As the number of smaller bass decreases, the forage base will increase and larger bass have more food to get bigger, but they will also become harder to catch due to an increase in their food supply.

Another species that needs attention is the yellow perch. The yellow perch population is over crowded and stunted because it lacks a suitable predator fish that will control its numbers. While largemouth bass will eat yellow perch, they do not share the same habitat. Stocking a predator fish that is better matched to the yellow perch is what is needed in Pines Lake. Walleye is a fish that we have used very effectively in other lakes to better manage stunted yellow perch. Walleye are members of the perch family and share the same habitat. Our recommendation is that you start by stocking 2000, 6 to 8 inch walleye in the fall of the year. It is important to understand that you should not proceed with the stocking of walleye if you are not going to proceed with the harvesting recommendations on the largemouth bass. Stocking walleye without removing bass from the lake will result in a decrease in both forage populations of yellow perch and bluegills leading to a decrease in size and weight of largemouth bass in the lake.

In review, it is the recommendation of Aquatic Technologies, Inc. that the following steps be taken to improve the fish population of Pines Lake. There should be no harvest of any largemouth bass larger than 16 inches and less than 20 inches. Aggressively harvest largemouth bass that are 11 to 16 inches from the lake. No largemouth bass should be stocked since they are reproducing at a high rate. Stock 2000, 6-8 inch walleye in the fall of the year. In order to protect these fish from being harvested at a young age, there should be no harvest of walleye less than 20 inches. The fish population should continue to be monitored to study the results of such stockings and to adjust recommendations. Since problems with a fish population can develop rapidly and cause long-term changes in the quality of the fishery, it should be surveyed again in 2010.

## **WATER QUALITY DATA**

### **Total Alkalinity: 51.0 mg/liter**

Total alkalinity refers to the total concentration of bases in water expressed as milligrams per liter of equivalent calcium carbonate. Waters with total alkalinity of less than 20 mg/liter usually have little available carbon dioxide to permit growth of plankton which is the main source of food for bluegills and other forage fish in your Lake. Since the alkalinity in your lake is greater than 20 mg/liter, plankton growth should be sufficient for the forage base.

### **Total Hardness: 109.0 mg/liter**

Desirable levels for total hardness for fish production usually fall in the range of 20 to 300 milligrams per liter. Hardness is not as important as alkalinity but should be of about the same numeric value. The hardness of your lake falls within this recommended range and indicates a suitable level for fish production.

### **pH: 7.6**

The desirable range for fish production is pH 6.5 to 9.0. Any pH value found in the range pH 4.0 to 6.5 is in the slow growth range. Very little if any reproduction will occur if the pH is in the range of pH 4.0 to 5.0. The acid death point for fish is around pH 4.0 or less. The pH in a lake will vary during the day based on weather conditions. Usually a lake's pH will be higher on a sunny day in the afternoon than it is in the morning. This is a result of the algae and other plants that are present in the lake. The pH of your water falls within this desirable range, but should be checked from time to time.

## **WATER QUALITY MANAGEMENT**

The water quality parameters that were tested during the survey indicate that there is good water quality for fish production and other recreational activities. The greatest concern at this time is preventing nutrients from entering the lake. The faster nutrients enter a lake, the faster it will age, resulting in more management problems. Management of nutrients entering Pines Lake should be one of your greatest concerns for the long-term management of the lake.

## CONCLUSION

Pines Lake is a valuable resource that with proper management can produce exceptional recreational opportunities for years to come. Management guidelines for the fish population should be followed if improvements are going to be made. The fish population should be studied on a regular basis to evaluate the results and make adjustments to the management recommendations.

## RECOMMENDATIONS TO FOLLOW

- Aggressively harvest largemouth bass from 11 to 16 inches from the lake.
- No harvest of largemouth bass over 16 inches and under 20 inches.
- Stock 2000, 6 to 8 inch walleye.
- No harvest of walleye under 20 inches.
- No stocking of any other fish.
- Survey the fish population in September 2010.

**TABLE 2**

Survey Data on Pines Lake taken 10-1-08

SPECIES	NUMBER SAMPLED	LARGEST FISH	MOST COMMON SIZE
Largemouth Bass	78	19"	15"-17"
Smallmouth Bass	4	18"	16"-18"
Chain Pickerel	5	15"	12"-15"
Northern Pike	7	37"	29"-31"
Bluegill	187	9"	7"-9"
Pumpkinseed	88	8"	6"-7"
Yellow Perch	340	11"	5"-6"
Black Crappie	9	11"	9"-10"
Brown Bullhead	12	11"	11"-12"
White Perch	3	10"	9"-10"
Rock Bass	1	6"	

2008 Pines Lake Largemouth Bass Sample

Figure 1

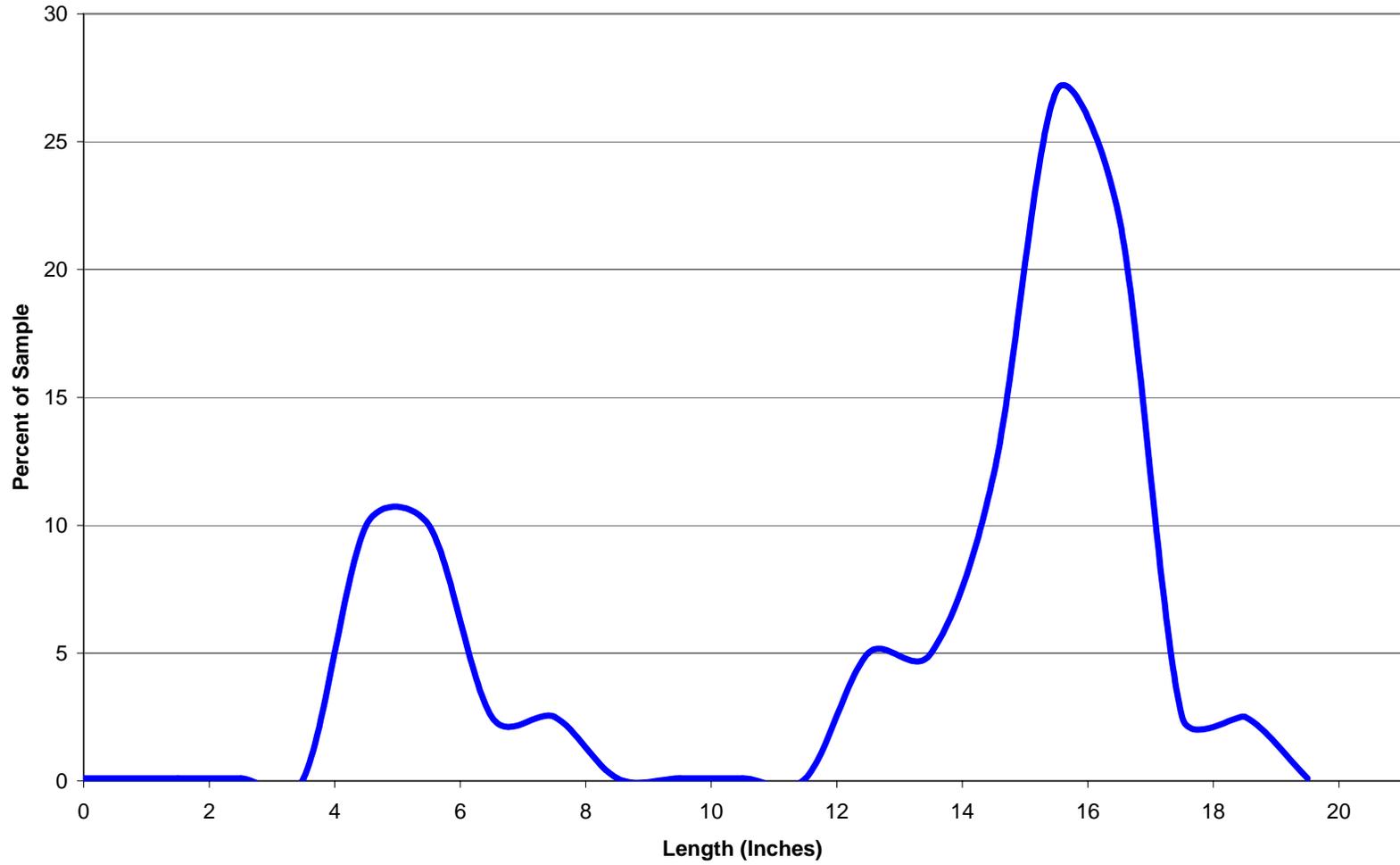
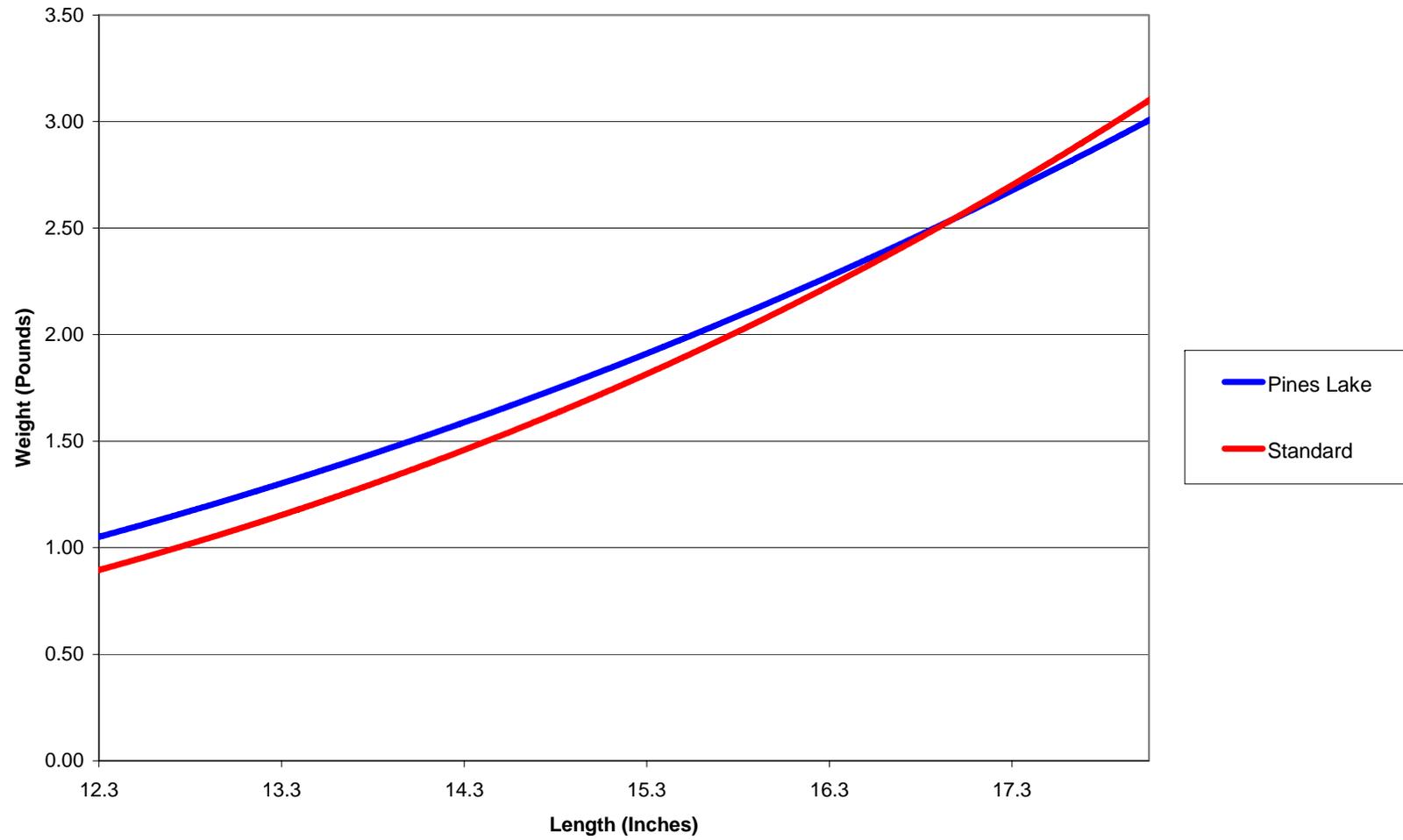


Figure 2

2008 Pines Lake Largemouth Bass Length / Weight Ratio





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NO SWIMMING  
NO BOATING



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