

LAKE APOPKA, FLORIDA, FISH KILL

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May 16, Continuing, 1963

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Abstract

Beginning about May 16, 1963, and continuing to the present, gizzard shad and a few game fishes began dying in this 42.2 square mile area lake. To date, an estimated three million pounds of fish, mostly gizzard shad, have died and their carcasses are scattered along the lake shore and are floating in the water. About 98 percent of the fish killed are gizzard shad, 1 percent game fish, and 1 percent bullheads and catfish.

A. D. Aldrich, Director, Florida Game and Fresh Water Fish Commission, called a conference to discuss the possible causes. The State Board of Health suggested supersaturation with oxygen due to plankton growth as the probable cause of fish kills. Disease, use of insecticides, and toxic algae were suggested as more probable causes. Field observations (by Surber) strongly indicate insecticides as the cause. There are 18,000 acres of agricultural crop lands at the north end of the lake. Corn crops (worth 2 million dollars) are sprayed daily, and it was learned that the spray drifts out over the lake when the wind is out of the north or northeast. Parathion, DDT, and toxaphene are the sprays used.

Russell Fielding, U. S. Fish and Wildlife Service, offered to investigate the fish disease angle further and Surber brought samples of water, both preserved and unpreserved, for analyses for presence of insecticides and toxic algae.

Lake Apopka, Florida, June 11, 1963.

Field Observations

Upon arrival at Orlando, Florida, I went to Lake Apopka with State Conservation Officer Graham. We contacted Harold Moody, Biologist of the Florida Game and Fresh Water Fish Commission, resident of Winter Garden, located on the lake. We launched Graham's boat and went in search of dying fish. Very few of these were about in spite of the many dead shad floating about.

At the Winter Garden dock and launching ramp, there were carcasses of dead gizzard shad and a few speckled bullheads and crappies in various stages of decomposition on the beaches.

Moody stated that the kills started about May 16. Around May 20, he estimated that 100,000-200,000 pounds of fish, mostly gizzard shad, had died. At one time, he estimated a million pounds of shad floating or beached on the shores of this lake which has an area of 42 square miles. The total kill to date has been estimated to be three million pounds.

He was asked first about oxygen levels in the lake. The oxygen content of the water ranged from about 7 p.p.m. in the morning to supersaturation (as much as 200 percent) in the afternoon. The pH levels increased during the day from about pH 8.0 to about pH 9.0. He said that there had been no critical nocturnal depression in the oxygen content during these kills. Planktonic algae appeared to be abundant in the lake, but microscopic examination of a fresh sample showed much detritus and not a superabundant phytoplankton crop; at least the water was not "soupy" with algae as has been noted in other Florida lakes such as Lake Harris, where shad abound.

Two dying fish were examined. The first was a black crappie about 8 inches long. Dactylogyrus, a monogenetic flatworm parasite, was common on its gills which were badly damaged. A species of Scyphidia and Trichodina were also present but few in number. The second fish was a gizzard shad about 10 inches long. No gross parasites were found on its gills and body surfaces, and the only evidence of gill damage was a few scattered hemorrhaged areas. A special search was made for Cytophaga colummaris bacteria, a widespread, rapid, and often selective killer of fish at this season. None were found.

June 12, 1963.

Following the conference on the morning of June 12, I returned to Lake Apopka with Harold Moody and Joe Burgess, Biologist of the State Board of Health. We arrived there about the middle of the afternoon and searched for dying fish for close to two hours in Burgess' boat. Only three fresh dead (limp) fish were found and none living. I examined two of these gizzard shad, one a specimen about 3.5 inches long, and the other about 11 inches, but could find nothing of note on their gills and in scrapings from their body surfaces. When the body cavity of the larger fish was opened, it was found that decomposition had already begun.

On this second trip on the lake in the Winter Garden and Oakland area, there were dead shad in sight in almost any direction one looked. The dead fish were numerous along the shore. This trip caused me to abandon an earlier idea (held before the conference) that the fish may have been killed by disease, possibly a virus, or that they were dying from algal poisoning.

It became obvious that the fish were dying quickly in groups at intermittent intervals. At the conference and beforehand, we were informed of the daily spraying of corn and other crops along the north and northeast shores of the lake. The insecticides used were reported to be parathion, DDT, and toxaphene. On the evening of June 12, Chic Archer, creel census operator for the Florida Game and Fresh Water Fish Commission, who is on the lake daily, was invited to Moody's home to give a report of his observations on the possible relationship between spraying operations and the mortality of fish in the lake. We obtained more than circumstantial evidence that there was a close relationship, and a promise that he would take particular note in the future of the time of occurrence of sprays reaching the lake surface and time of fish kills. He had his creel census notebook with him and was able to connect a large kill on June 4 and 5 with a spraying operation that occurred on the afternoon of June 3, when in his own words he encountered a "wall of spray out over the lake." Archer has not only had his boat windshield splattered with liquid insecticide carrier, but also he has noted dust over the lake and on the surface several times. He has observed this previous to fish kills. He also told of an instance reported to him by Major Turk at Mont Verd Fish Camp in which a man and his wife were drenched with insecticide spray while fishing in the outlet canal when a plane flying low overhead failed to shut off the spray in crossing the canal. These people returned to the camp, changed their clothes in fear of an unknown poison, and left the lake. Most of these farms along the north shore are in the 9,000-acre Zellwood Drainage District, and aerial spraying operations occur out of the MacDonald Flying Field off Highway 441, but the Dudos have an additional 9,000 acres of crop lands west of the canal in this area.

From my observations on the lake during the afternoon and evening of June 12, I am now of the definite opinion that the fish kills are the result of the spraying of insecticides. Why then are more game fish not being killed? I think the answer to this is connected to the habits of the fish most affected and their relative abundance. The gizzard shad undoubtedly are feeding mostly on planktonic algae near the surface in closest proximity to the spray, and the species itself is undoubtedly more sensitive to insect sprays than are the game fish such as bass, crappies, and bluegills.