

Moody

Conference on Lake Apopka Fish Kills
Orlando, Florida

The meeting was held at the Angebilt Hotel at 10:00 A.M., June 12, 1963, in Orlando, Florida. A. D. Aldrich, Director, Florida Game and Fresh Water Fish Commission, served as Chairman. Present at the meeting were the following persons:

- A. D. Aldrich, Director, Florida Game and Fresh Water Fish Commission, Tallahassee.
- William Woods, Chief of Fisheries, Florida Game and Fresh Water Fish Commission.
- K. K. Hofstetler, Sanitary Engineer, State Board of Health.
- J.W. Springstead, Sanitary Engineer, Winter Haven, State Board of Health.
- Joe Burgess, Biologist, Winter Haven, State Board of Health.
- C. W. Sheffield, Sanitary Engineer, Orange County Health Dept. , Orlando.
- ____ Whittaker, Chief Sanitarian for Orange County, Orlando.
- Harold Moody, Fishery Biologist, Winter Garden, Florida.
- J. W. Bickerstaff, Regional Supervisor, Florida Game and Fresh Water Fish Commission.
- Clayton Phillipy, Fishery Biologist at large, Winter Haven.
- Rosco Hamilton, Wildlife Officer, Florida Game and Fresh Water Fish Commission.
- Don Schieswold, Florida Water Resources Commission, Tallahassee.
- Russell Fielding, U. S. Fish and Wildlife Service, Atlanta, Georgia.
- Donald McAllister, Orange County Sportsmans' Association, Orlando.
- Don Rider, Orlando Evening Star.
- E. W. Surber, U. S. Public Health Service, R. A. Taft Sanitary Engineering Center, Cincinnati, Ohio.

Mr. Aldrich explained that the purpose of the meeting was to review possible causes of the fish kill in Lake Apopka and to pool the knowledge and experience of those present in offering a solution for it, or future course of action to obtain a solution. The Governor of the State had received numerous complaints, and both the Board of Health and the Game and Fresh Water Fish Commission had received many letters. He stated that an adequate explanation of this kill would help solve the mysteries surrounding the kills of fish that are occurring in many other lakes in Florida.

Bill Woods furnished facts regarding the current kill in Lake Apopka which began about May 16, 1963. A second kill estimated at a million pounds occurred May 19, 1963. Most of the dead fish showed up in the southern half of the lake in the vicinity of Winter Garden. The dead fish scattered along the beaches produce a public nuisance of the first order. Fish have continued to die throughout the summer and are still dying. An estimated three million pounds of fish have been killed since mid-May. Of the May 16, 1963, kill, gizzard shad made up 98 percent of the fish affected; bluegills, shellcrackers, and crappies, 1 percent; and speckled bullheads and catfish, 1 percent. When the lake produced its first bloom of algae back in 1947, gizzard shad made up only 20 percent of the fish population.

Mr. Aldrich called upon Mr. Don Schieswold of the Florida Water Resources Commission (Board of Conservation), to describe water level fluctuations in the lake. Although a natural lake, levels are now being controlled by the Board of Conservation cooperating with the Corps of Engineers, who pull the normal level down to accommodate potential flood waters. Present stage is 65.5 feet above mean sea level and about 6 inches below normal. They

attempt to hold the levels between 66 and 67.5 feet. Most of the lake is under 10 feet deep and the deepest area (15 feet at 65 feet 0.5 inches) is near Oakland. Average evaporation rate at this season is 5-6 inches per month. The present discharge through the outlet structure is 20 c.f.s. Don McAllister expressed his belief that the gates should be kept closed and no attempt should be made to create a pool for water storage. This water could be used to advantage he said for the dilution of nutrients added to the lake through the increased use of fertilizers on the farms about the lake and by pollution from a concentrate (citrus) plant located at Winter Garden and other sources.

Mr. Hofstetler of the State Board of Health, was called upon next to give the results of studies on the lake and an opinion on the cause of the fish kill. He stated that the Board had made studies in the area while the concentrate plant was down (not operating). Effects of the plant were believed to be only local, and wastes from the plant were described as low in nitrogen and phosphorus. He stated that they did not believe that the spraying of crops with insecticides nor the pollution from the concentrate plant at Winter Garden were causing the kill. The Board of Health is preparing a report on their findings on conditions in the lake, but this was not yet ready. Mr. Hofstetler also stated that a meeting of the known polluters of the lake was being arranged for sometime in July.

Hofstetler was convinced that the kills were being caused by oxygen supersaturation due to planktonic algae. I expressed a different belief based on examples of popeye and blisters in trout and smallmouth bass in hatchery troughs and fish ponds in cases of real but rare kills by supersaturation. Mr. Fielding supported me in my view stating that farm

pond fishes live with supersaturation continually without harm.

Don Rider's statement in the Orlando Star of June 13, goes a little far in stating that I disagreed with State Biologists in my estimation of the cause of the kill. To many it may give the impression that I disagreed with everybody; whereas I was there to help solve a problem and merely expressed a strongly contrasting view which was in accordance with the views of some of the other biologists. When asked about B.O.D.'s in the lake, Hofstetler and Springstead observed that B.O.D.'s ran from 2.5 to a high of about 12.5 p.p.m. in the immediate vicinity of the concentrate plant. The high nitrogen content (about 14-15 percent) and phosphorus content (about 2 percent) of the dying fish and the selective poisonings of 1957, 1948, and 1959 in which an estimated 20 million pounds of shad were killed, were believed to have had a fertilizing effect and introduced fertilizing elements which stimulated algae which, in turn, produced supersaturation. Someone, I believe Mr. Aldrich, pointed out that no more nitrogen and phosphorus were actually being added because these elements had to come originally from the lake waters in some form.

When called upon for my opinion on the causes of the fish kill, I suggested that such a large fish kill must be due to one of three causes:

- (1) a fish disease, possibly a virus disease since Columaris disease was not present in the two living fish already examined microscopically;
- (2) by insecticides drifting out over the lake; or (3) by toxic algae. I discounted the latter because the algae were not abundant enough.

Mr. Fielding, U. S. Fish and Wildlife Service, offered to investigate further the disease possibility, and I offered to arrange for analyses of fish

and water samples for the presence of insecticides.

During my discussion of the possible toxic algae cause of the mortality, I suggested that the quantity of the bloom present could be determined in parts per million at intervals of about two weeks by centrifuging lake samples and weighing the residue from known volumes in porcelain boats. If the time of fish kills could then be noted, algae abundance and fish kills could be correlated.

Dr. Palmer examined a sample of water taken in the Winter Garden area and brought back unpreserved to the Center. He found Lyngbya contorta, Microcystis (blue-green algae), Malosira, Nitzschia, Oocystis, and Scenedesmus to be the most common forms of algae and recorded ten additional species present. He was of the opinion that the blue-greens were not abundant enough to cause fish kills.