THREE YEARS OF WATERFOWL MANAGEMENT ON TVA POWER RESERVOIRS

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Kentucky Reservoir, the last of a chain of 26 TVA Reservoirs stretching from Eastern Tennessee through Northern Alabama and through West Tennessee into Western Kentucky, is the largest man made reservoir in the world. This huge body of water is 184 miles long and covers a total of 156,000 acres at normal pool. A fluctuation in the water level of approximately five feet is planned for normal manipulation for navigation and power, with the dam and other facilities constructed and arranged to handle 16 additional feet of water in times of flood. Normal pool level is 359 feet above sea level. Though flood control is the first of three major reasons for construction of the reservoir, the possible need of filling to maximum contour for flood control is considered as remote.

Lying only 46 miles to the East of the Mississippi River and less than 10 miles from the Ohio River at its nearest points to same, Kentucky Reservoir is close enough to the Main Mississippi waterfowl flyway to offer excellent possibilities of waterfowl use on the waters impounded behind its dam.

Kentucky Dam was completed in 1944 and waters began backing up immediately afterward. By late fall of 1944, waters had backed up to the 345 ft. contour, innundating thousands of acres of farm lands and recently cleared timbered areas. Waterfowl were to be seen in every section of the impoundment in countless thousands. Estimates made by TVA game technicians placed the total number of ducks on the reservoir at that time at approximately 250,000. Coots were as numerous as the ducks. Practically all species of ducks found in the Mississippi Flyway were to be seen daily. Food in the reservoir consisted of ungathered crops of corn, beans, peas and other domestic crops and hundreds of tons of seed from weeds, grasses and acorns which could be found banked up in drifts of huge proportions in every section of the impoundment's margin. The gradual rising of the water made more food available daily. Natural foods, (weeds and grasses) were used in much greater quantities than domestic crops because of the correspondingly greater amount of same.

Where one year before, ducks had been so scarce as to be practically nonexistent, the jack-pot had fallen and ducks were to be had just anywhere and by the thousands. Duck hunters and nature lovers living in the vicinity of Kentucky Reservoir concluded that over-night they had been given a duck "heaven" in the waters of the lake.

The following year, however, saw a great change in waterfowl use. Where, during the first year of impoundment, waterfowl could be found almost anywhere, the second year saw ducks beating their way almost exclusively into the dewatering projects maintained by TVA for malaria control. In these dewatering projects thousands of ducks stopped over to feed on grasses, weeds, acorns and crops which had been produced during the summer and early fall and flooded after the malaria season had passed. In the second year ducks appeared in only from 25% to 33% of the numbers present in the first year of impoundment.

Here, and here only, was food to be found in appreciable quantities as the fluctuation of the water in the main reservoir had in one year eliminated all possibilities of food produced in the quantities found during the first year of impoundment.

The dewatering projects previously mentioned should be described in more detail. In certain areas, TVA engineers and biologists concluded after comparing notes and estimates that the malaria control program to which there were bound by law, could be better managed and more cheaply handled by damming off arms of the reservoir with dikes and keeping same pumped dry during the breeding season of the anopholene mosquito. As a result seven dewatering projects were constructed, complete with large pumps for dumping the water over the dikes into the main lake. In almost every case the dewatering projects lie below the normal pool level of the reservoir. These dewatering projects have a total of more than 10,000 acres of affected lands with possibly half being in agricultural land. These dewatering projects are kept pumped dry of water from about May 15 to October 15 and after that time the water is permitted to fill up and cover the lands diked off from the main lake.

Two of the projects have been included in the Tennessee National Wildlife Refuge and five made available to the Tennessee Division of Game and Fish for waterfowl development work.

The Tennessee Division of Game and Fish, through Pittman-Robertson funds has set up a program of development which now, in its third year, has produced some interesting and highly satisfactory results. This program has been planned to take advantage of the fine agricultural opportunities offered in the dewatering projects as the main part of its program, but with development of island areas for geese already under way and expanding as a secondary phase of the program. Results of efforts on Kentucky Reservoir have been so satisfactory that expansion to two other Reservoirs in East Tennessee has been made. Other developments, such as constant-level pools for production of aquatic plants and seasonal pools for more widely distributing feeding areas of domestic crops, are planned but not yet constructed.

Agricultural development in the dewatering projects has consisted of the farming of lands which are fully or partially flooded in fall and winter. Crops of corn, soy beans, combine milo, peas, browntop millet, sunflower and buckwheat are planted. Complete use of all flooded crops has been the case to date.

During the 1946-47 season of development a total of 293 acres was planted to the above crops. That fall and winter an average of 2,000 ducks used the areas developed during the shooting season and reached a peak of 6,000 in February at which time the food was all utilized. Practically all ducks were ringneck, mallard and blacks with numbers in the order named. The average West Sandy kill was 0.74 ducks per man-day of hunting, 9.2 ducks per man-season. Heavy shooting in this area resulted in the ducks soon learning to sit out shooting hours on the nearby refuge and use the food at night.

On November 7 of the 1947-48 season the main flight of ducks began and on November 12 an estimated 30,000 were using the West Sandy Project alone. On November 17 an estimated 33,000 for the entire section of the reservoir in Tennessee indicated a drop in numbers on that date. The estimates are based on aerial surveys of duck habitat. On November 24 approximately 98% of the flooded crops in West Sandy had been consumed with preferences for the crops in the

order in which they follow: milo, browntop millet, corn, peas, and soybeans. A total of 145 acres of planted crops were thus taken in less than two weeks. Later, with the opening of the hunting season and more water in the units of the federal refuge, many birds left the shooting areas for the safety and feed to be found there.

A total of 270 acres of crops planted in more suitable locations produced a much better yield of food than the previous year and was supplemented by a bumper crop of acorns and beech mast in the flooded woodlands. On the opening day of the 1947-48 shooting season about 4000-6000 ducks were using the West Sandy project. Mallards and black duck made up 90% of the total. On that day 345 hunters in West Sandy fired at least 4,000 shots and took less than 100 ducks. It is now clear that large numbers of hunters firing wildly in an effort to beat their neighboring gunners to a bird in heavily concentrated shooting areas is a successful method of saving ducks and at the same time furnishing shooting to one and all.

Most the birds were shot at while well out of crippling range of the guns and they immediately beat it to the refuge to await darkness before entering the shooting area to feed. For the 1947-48 season the daily average was 1.12 ducks per man-day of hunting, season's average was 8.8, crippling losses amounted to 0.614 per man-day and season's cripples per man was 4.8. (Cripples were determined only by birds observed as hit by the hunters and does not include those shot without any indication of same.) The smaller season's kill per man for 1947-48 in comparison with 1946-47 season is attributed to the shortened season for hunting.

As a result of opinions of various wildlife technicians working on Kentucky Reservoir, it is thought that 200,000 ducks stopped on the reservoir during the season of 1947-48, 20,000 ducks and 500 Canada Geese wintered there, and at one single time the maximum number ducks on the reservoir was 100,000. Expansion of development work during the 1948-49 will encompass better than 900 acres of land treated, 300 acres of which will be winter grains, buckwheat, corn and soy beans on islands of Kentucky, Chickamagua and Watt's Bar Reservoirs for wintering geese.

An old fishery pond of 70 acres has been turned over to the State near Chickamauga Reservoir and management commenced in 1947 by draining and planting the lake bed to agricultural crops, being flooded in the late fall. Results obtained in this manner have been excellent. An indicated increase in kill on this pond of from 26 ducks in 1946 to 147 ducks and 37 geese in 1947 after treatment is indicated from the records of the Watt's Bar Sportsmen's Club. This is in an area not considered as waterfowl habitat and off the main flyways.

On Chickamauga Reservoir in East Tennessee also lies the Hiwassee Island Refuge, a state operated unit for Canada Geese. In 1940 soon after impoundment of the reservoir about 20 Canadas wintered around Hiwassee Island. Since that date, in spite of erractic law enforcement and practically no genuine effort to increase habitat until 1947, the total wintering Canadas has increased to somewhere in the neighborhood of 2,500 in the winter of 1947-48.

Development for geese in Tennessee has been accomplished by use of barges to get farming equipment to islands where plantings of oats, rye, wheat, barley and rye grass are made. Buckwheat planted in early August, followed by a later planting of rye grass in the buckwheat is being done this season as an experiment

in furnishing both grain and greens in one area. Rye grass planted in mud flats exposed by fall drawdown last season resulted in excellent stands of winter greens which survived long periods of flooding. Use by both geese and ducks (chiefly woodducks) was observed. Rye grass is planted simply by throwing the seed on the mud flats. No covering is necessary, thus making such an operation a cheap and simple one. Planting operations are usually discontinued about October 15.

Some of the conclusions and apparent facts that have been shown in the three years of operations in waterfowl development on power reservoirs in Tennessee are:

(1) Waterfowl may be induced to winter on power reservoirs by furnishing sufficient food for them.
(2) Malaria control and waterfowl management can be correlated in at least some instances.
(3) Canada Geese will use power reservoirs in increasing numbers if given protection and food.
(4) Heavy concentrations of hunters in limited shooting areas tends to reduce the kill of ducks by inducing hunters to shoot wildly at high flying birds.
(5) Experiments with the fishery pond in East Tennessee indicate possible success with other fish ponds in attracting waterfowl by complete or partial drainage and agricultural development of exposed land.
(6) Where ducks can find feed in flooded areas, little effort will be made to go out on dry land to feed, but where no flooded feeding areas are available, mallards, pintails and black ducks will feed on islands and upland fields planted to suitable grains.