THE STATUS OF CERTAIN SPECIES OF BIRDS ON THE LAKE CARL BLACKWELL PROJECT

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Since March 1939 the writer has attempted to follow and explain the changes in the numbers of all species of birds seen on the Lake Carl Blackwell Project west of Stillwater, in Payne and Noble Counties, Oklahoma. From August 1940 until April 1942 Dr. Joseph C. Howell of the Zoology Department, Oklahoma A. and M. College, also kept records of the birds seen on this area. The findings of these two studies through October 1941 were combined and published (Baumgartner and Howell 1942).

During the period from the spring of 1939 to the fall of 1944 conspicuous changes have occurred in the numerical status of three groups of birds—fish-eating species, waterfowl, and hawks and owls.

The increase in the surface area of Lake Carl Blackwell from approximately 1000 acres in the spring of 1939 to nearly 3000 acres in the summer of 1944 has been accompanied by the development of a more complete and stable fish population. This increased availability of fish for food has been accompanied by marked increases in the numbers of certain fish-eating birds. The percentage of days during the months of May, June, August, September, and October on which each was seen has been used as an index to abundance. Records were limited to those days on which at least two hours were devoted to observations in suitable habitats for the species. For example Table I reveals that the Osprey *(Pandion haliaetus carolinensis)* was not recorded on any of the 16 days of observation in 1939 but was seen on three (13 per cent) of 23 days in 1940, etc. Table I demonstrates that with the exception

TABLE I

Population changes in the Osprey and Common Tern Based on surveys during the months of May, June, August, September and October

Year	Number of days on which observations were made	Percentage of days on which species was seen	
		Osprey	Common Tern
1939	16	0%	0%
1940	23	13%	0%
1941	19	21%	32%
1942	16	31%	6%
1943	24	17%	0%
1944	8	37%	37%

of 1943 the number of Ospreys and Common Terns *(Sterna hirundo hirundo)* has increased conspicuously since 1939 and 1940. The decrease in 1943 was apparently due to less favorable feeding conditions resulting from fluctuating lake levels and muddy waters caused by lowering of the lake to repair the dam. Other species such as the Black Tern *(Chlidonias nigra surinamensis)*

and the White Pelican *(Pelecaus erythrorhynchos)*, which feed at least to some extent upon fish, have shown a less marked increase.

TABLE II

Winter waterfowl populations at Lake Carl Blackwell

1938-39	300	(Estimated from March 1939 population)
1939-40	1000	
1940-41	2100	
1941-42	1500	
1942-43	700	
1943-44	800	

The population of waterfowl has also revealed some interesting changes that are summarized in Table II. In 1939 and 1940 rather-stable or gradually rising water levels resulted in favorable feeding grounds; and, in proportion to the size of the lake, the number of waterfowl, particularly surface-feeding ducks, was large. Beginning in the fall of 1941 heavy rains materially increased the size of the lake and caused greater wave action and more extensive water fluctuations. As a result most of the beds of aquatic vegetation and frequently littoral vegetation that formerly furnished acres of feeding grounds were destroyed. Owing to these unfavorable feeding conditions the number of ducks remaining for a period of several days or more has been conspicuously lower since the spring of 1941. At times large flocks of ducks, particularly of those species that feed on the bottom in deep water, have settled on the lake to stay only for a day or two, the food supply being apparently insufficient to satisfy the needs of large numbers. This condition is of particular significance in view of the fact that the continental waterfowl are reported to be increasing each year (Anon. 1943).

The hawk and owl populations have undergone a very marked change during this period. When studies were begun in the spring of 1939 these birds were conspicuous at all times over this section of the state and numbers of several species were seen on every field trip. This spectacular abundance reached its peak in December 1939, when as many as 25 Marsh Hawks *(Circus cyaneus hudsonius)* and lesser numbers of several other species of hawks and owls were counted per square mile on several dates. This abundance continued until early January when an extended period of snow and cold weather was followed by the complete disappearance of some species and a very marked reduction in the numbers of others. At the time the writer thought that the snow and cold weather had forced the birds to move southward beyond the storm but studies on the importance of small rodents in the diet of the predatory birds revealed a better explanation of this decline. An analysis of hundreds of hawk and owl pellets in 1939 showed that small rodents, particularly the Texas cotton rat *(Sigmodon hispidus texianus)*, constituted the major food of most species of hawks and owls in this area during 1939. As reported by Schendel (1940) cotton rats practically all died off during January 1940 and as a result many predatory animals either moved out of the area or changed their diet. In the case of the hawks and owls practically no carcasses were found and a limited number of returns on banded birds suggests that these birds merely moved southward and eastward beyond the area affected by the storm. Table III indicates the abrupt drop of predatory-bird numbers and, as noted in the footnote, the figures for early January tend to obscure the abruptness and severity of the decline. Since 1940 the small-rodent populations have made a noticeable but rather limited recovery and the predatory birds have shown a corres-

TABLE III

Hawks and owls seen per mile

1939	January—March	----	September—December	13.05
1940	January—March	2.09*	September—December	.66
1941	January—March	.38	September—December	.92
1942	January—March	.75	September—December	1.08
1943	January—March	1.17	September—December	.91
1944	January—March	.72		

*Chiefly during the first half of January before the small rodents died off

ponding increase. With the reduction of the amount and quality of ground vegetation that has accompanied the development of grazing over most of the project it is entirely possible that neither the rodents nor the hawks and owls will again soon become as plentiful as they were in 1939.

The changes in the numbers of these three groups of birds illustrate the effects of weather and other factors, such as the development of a large artificial lake, that modify the natural environment. Such changes in animal populations are known to occur even under the most stable natural conditions and with man's activities more or less constantly modifying the environment conspicuous changes can be expected from time to time.

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