birds (Kear, 1973, op. cit.). The white pelicans were from a recently established (1968) breeding colony (Grewe, pers. comm.). Numbers of chicks banded have increased from about 10 in 1969 to about 1,450 in 1985. It is also possible that the defect may be the result of inbreeding. Further investigations into the parentage of these birds is in progress and observations for similarly affected birds in this colony will be made in the future.

The impact of these abnormalities on free-flying populations of white pelicans is probably low. However, since such reports are scarce, the true importance of these lesions is difficult to access.

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## Mass Mortality of Bats Due to Probable Blue-green Algal Toxicity

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On 2 August 1985, campers at Steele Lake campground in Cross Lake Provincial Park (approximately 150 km north of Edmonton, Alberta) observed many dead bats floating face-down on the water. Park staff counted 500 and estimated over 1,000 dead bats and at least 24 dead mallards (*Anas platyrhynchos*) and American wigeons (*Anas americana*) in an area approximately 300 × 150 m on the downwind side of the lake. The water in this area was covered with thick white scum and appeared to have a "blue-green sheen." Seven bats and two ducks were collected and frozen. No water samples were taken. Campers were advised not to swim in or use water from the lake. By 4 August, the scum had disappeared and the water returned to its usual color. No further wildlife mortality was noted.

Six *Myotis* spp., one hoary bat (*Lasiurus cinereus*), and two mallards were examined at the Provincial Veterinary Laboratory in Edmonton. Specimens were covered with green slime. Post mortem and histologic examinations indicated all animals were in good to excellent body condition and lacked evidence of inflammatory, traumatic, or degenerative changes. The bats and ducks had been feeding recently and death appeared to be very acute. Toxic alkaloid of the blue-green alga *Anabaena flos-aquae, Anabaena* Very Fast Death Factor, was identified in substantial concentration in the green slime from the carcasses. The naturally-occurring alkaloid was extracted directly by the methods of Carmichael (1974, Ph.D. Thesis, University of Alberta, Edmonton, Alberta, 134 pp.) and indirectly as the *N*-acetyl derivative, 2,9-diacetyl-9-azabicyclo-[4.2.1] non-2,3-ene, by standard solvent extraction techniques modified by the addition of acetic anhydride to the final evaporation step. The extracts were examined by gas chromatography/mass spectroscopy and the substances were identified by their fragmentation patterns.

Algal blooms develop under restricted environmental and ecologic conditions and

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are highly transient in nature (Wobeser, 1981, Diseases of Wild Waterfowl, Plenum Press, New York, 300 pp.). Thus, diagnosis of algal poisoning is difficult. The geographic distribution of mortality relative to wind direction, transient visual changes in the water, extremely acute death, presence of toxic algal factor on the carcasses, and lack of evidence of other diseases suggest blue-green algal toxicity as the probable cause of death of the bats and ducks.

Algal poisoning usually is associated with death in domestic animals or waterfowl on prairie wetlands during the summer (Wobeser, 1981, op. cit.) and there is only one previous report from the boreal-mixedwood ecoregion of central Alberta (O'Donoghue and Wilton, 1951, Can. J. Comp. Med. Vet. Sci. 15: 193–198). It has not been reported as causing mass mortality of bats. Bats skim low over water to drink during foraging periods. The amount of water ingested is minimal yet was apparently sufficient to cause rapid death of a large number of individuals. Bats may be highly susceptible to the toxin.

Staff of Cross Lake Provincial Park and the Provincial Veterinary Laboratory are acknowledged for their assistance in this case.