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Received 20 April 1978.

Accepted 3 February 1979.

CANVASBACK SEX RATIOS ON RHODE AND WEST RIVERS, CHESAPEAKE BAY, 1972-78

Imbalances in sex ratios of flocks of certain North American ducks have been documented since the 1930's. The proportion of drakes among canvasbacks (*Aythya valisineria*), recorded mostly during the spring months in 10 regions of North America, ranged from 53 to 79%, averaging 66% or approximately 2 males per female (Bellrose et al. 1961). A better understanding of the sex ratio in canvasbacks is important, especially because evidence from midwinter waterfowl inventories indicates a continuing decline in the total population (Trauger 1974). Concern for the welfare of the species has been expressed in scientific and popular literature (Geis 1959, Perry 1974, Trauger 1974). This paper reports sex ratio counts of canvasbacks from the winters of 1972-73 through 1977-78 on the Rhode and West rivers, which are brackish, estuarine inlets on the western shore of Chesapeake Bay, Maryland. The study area included about 24 km of shoreline that was declared a no-hunting sanctuary by the Smithsonian Institution in 1962.

Canvasback populations in the study area reached peaks of approximately 2,300 in February 1973 and of over 5,000 in January 1974. The ducks loafed and slept during the day, departed at dusk

and returned at dawn. Little feeding was observed, suggesting that the area's primary value was as a refuge during the daylight hours. Canvasbacks first arrived in late October or early November and all but a few stragglers had left by mid-April. The sexual dimorphism in canvasback plumage is such that adult and juvenile males can be differentiated from females by 1 November (Olson 1965). Undisturbed canvasback flocks were observed with a tripod-mounted spotting scope with a 20-45× zoom eyepiece. The total numbers of individuals of each sex were determined in 308 flock counts. In this paper, sex ratios are expressed as the number of males to 1 female.

RESULTS

Canvasback flocks were separated into 4 size ranges (1-100; 101-1,000; 1,001-3,000; and 3,001-6,000). The numbers of males and females in the flocks counted were totaled and 1 sex ratio was determined for each flock size range for each month from November through April (Table 1). The sex ratios in the 1-100 flock-size range fluctuated inconsistently from November to April, but were always low and never exceeded 2.0. However, for flocks in the 101-1,000 and 1,001-

Table 1. Canvasback sex ratios (males per female) and number of flocks counted on Rhode and West rivers, Chesapeake Bay, for 6 winters, 1972-73 to 1977-78.

Flock size	Nov		Dec		Jan		Feb		Mar		Apr	
	Ratio	N	Ratio	N	Ratio	N	Ratio	N	Ratio	N	Ratio	N
1-100	1.3	38	2.0	26	1.9	24	1.8	19	1.5	33	0.8	4
101-1,000	1.5	34	2.3	22	2.7	5	3.7	10	2.3	31	1.0	14
1,001-3,000	2.5	2	2.5	11	3.9	8	4.2	15	2.4	9		
3,001-6,000					8.9	3						

3,000 ranges the sex ratio increased from 1.5 and 2.5, respectively, in November to highs of 3.7 and 4.2, respectively, in February. The ratio then decreased in March and April to a low of 1.0 in the 101-1,000 flock-size range in April.

The sex ratio increased as flock size increased in all months. For example, in December and from a total of 59 flocks counted, the sex ratio was 2.0 in flock sizes 1-100, 2.3 in the 101-1,000 flock size and 2.5 in the 1,001-3,000 flock-size range. Moreover, the highest sex ratio was counted in the 3 largest flocks: a total of 12,980 males and 1,461 females with a sex ratio of 8.9.

DISCUSSION

Nilsson's (1970) opinion was that "sex ratio counts of migratory ducks will only give information on differential sex migration." Our data for 101-1,000 and 1,001-3,000 flock-size ranges suggest a late arrival in the fall of a part of the male segment of the canvasback population and an early departure of this group in the spring in comparison with the rest of the population. Data given by Bellrose et al. (1961) for the Illinois River valley from 1940 to 1946, and by Smith (1946) for Lake Christina, Minnesota, for canvasback sex ratios during spring migration of 1942, support our results. They showed that a greater proportion of males than of females moved north early. The

later flights had a lower proportion of drakes than the early flights.

The tendency of the number of males per female to increase as flock size increases was noted by Beer (1945) in a sample of 316 canvasbacks counted in southwestern Washington in winter, and by Nilsson (1970) in tufted ducks (*Aythya fuligula*) and goldeneye (*Bucephala clangula*) wintering in southern Sweden.

Sowls (1955) reported an approximate 1 to 1 ratio of male to female canvasbacks at hatching. Differential mortality between male and female canvasbacks is an important factor influencing the disparate sex ratio in this species. Geis (1959) concluded that "females ordinarily have a higher rate of mortality than males during all times of the year." This was based on a study of band recovery data for canvasbacks. Bellrose et al. (1961) listed 5 causes of mortality in ducks and without the benefit of conclusive information asserted that appreciable losses among females during the breeding season might account for the predominance of males in the adult age group. They considered the effects of hunting to be insignificant. However, Olson (1965) demonstrated that female and juvenile male canvasbacks are more vulnerable to hunting than adult males in southern Manitoba.

The results of our close watch of 1 area throughout the winter season suggested that the number of male canvasbacks per

female may be greater than those previously reported. Earlier researchers did not report sex ratios of samples or individual flocks of canvasbacks as large as ours, and this may account for the less disproportionate ratios they found. Because the numbers of female canvasbacks have an effect on the reproductive potential, it seems important to gain a more accurate estimate of the sex ratio of this species. We suggest that if an attempt to estimate the sex ratio of a population of canvasbacks is to be made, especially for a large area such as Chesapeake Bay, it would be important to bear in mind that there seem to be predictable changes in sex ratios from month to month and in relation to flock size.

Acknowledgments.—We thank the Smithsonian Institution's Chesapeake Bay Center for Environmental Studies for the use of their facility, and the private landowners, especially John and Betty Colhoun and Sally Whall, of the Rhode and West River area where fieldwork was conducted. Financial support for the 1973–74 season came from the U.S. Fish and Wildlife Service (contract 14-16-0008-804) and from the Swan Research Program of the Chesapeake Bay Foundation. We are grateful to G. Allen, T. Inglehart, and R. Limpert for assistance with fieldwork.

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Received 7 June 1977.

Accepted 7 November 1978.

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RELATIONSHIP OF THE COLLARED PECCARY TO SACATON GRASSLAND

Studies of collared peccaries (*Dicotyles tajacu*) in the Southwest have shown that these animals use heavy cover for resting and sleeping during cold winter nights and hot summer days (Neal 1959, Eddy 1961, Ellisor and Harwell 1969, Schweinsburg 1971, Bigler 1974, Bisso-

nette 1976). Bedding areas include caves, mine-shafts, boulder fields, and, especially, dense stands of brush. During a 2-year study of the effects of wildfire on sacaton (*Sporobolus wrightii*) grassland in southeastern Arizona (Bock and Bock 1978), we found that collared peccaries