

Duck numbers in the USSR, the Western Palearctic and North America 1967-86: first comparisons

HUGH BOYD



In the late 1980s, there are believed to have been about 75 million ducks breeding in the USSR and 42 million in North America. In the USSR there had been fewer in the 1970s and more at the beginning of the 1960s. The North American numbers are probably lower than they have ever been: most of the recent decrease in duck numbers took place in the Canadian prairies, as a result of drought and intensified farming.

The trends and the year-to-year variability in the numbers of Anatini and Aythyini on the opposite sides of the Atlantic have resembled one another to an unexpected extent, and there are good reasons to continue and improve the monitoring of waterfowl populations on a large geographical scale.

The IWRB Symposium on Managing Waterfowl Populations, held in Astrakhan, USSR, 2-5 October 1989, provided a great deal of up-to-date information on the present status of waterfowl in many parts of the world. During the symposium no attempt was made to compare the changes taking place in different continents. Yet it may be useful to see how far ducks in different places may behave in similar ways in the USSR, the Western Palearctic and North America. Attention is concentrated on two abundant groups, the dabbling, or surface-feeding, ducks (tribe Anatini) and the pochards, or diving ducks (tribe Aythyini), about which most is known. The period dealt with in any detail is 1967-86, when the winter counting networks in Northwest Europe and the West Mediterranean were in full operation. Mid-winter surveys in the USA have been carried out since the early 1950s. They deteriorated somewhat during the 1980s, at least in some parts of the country, but are still adequate for simple comparisons of their results with those from the Western Palearctic.

The annual aerial transect surveys which sample a large part of northwestern North America in May and July have no counterparts in the Palearctic. The only available estimates

of the numbers of breeding ducks in the USSR suggest the magnitude of changes over recent decades but do not permit comparisons between individual years. There are no comprehensive estimates of the numbers of ducks breeding elsewhere in Europe, so that inter-continental comparisons are largely restricted to variations in the numbers of waterfowl found and counted in winter.

The North American data used here are those presented by Bartonek (1989) and Williams (1990), supplemented by earlier runs published by the US Fish & Wildlife Service in informal publications. The numbers for the Western Palearctic are from Monval & Pirot (1989) and Pirot *et al.* (1989). The data for the USSR are drawn from several of the papers read at the Astrakhan Symposium, especially that by Flint & Krivenko (1990). Some regrouping and recalculation was necessary to make comparisons easier. The representativeness and reliability of most of the data used are very uncertain, and were dealt with cursorily, or not at all, in the publications listed. Here the numbers are simply taken at face value, with no formal statistical analyses. The principal questions addressed are:

- 1) How many ducks are there in North America and the Western Palearctic?
- 2) How have duck numbers varied over the last two decades and are they increasing or decreasing in significant ways?
- 3) Have the changes seen on opposite sides of the Atlantic Ocean shown any resemblances?

Several geographical over-simplifications are made here, prompted largely by the extent and completeness of the available data. North America is taken to consist solely of Canada and the USA: although about 4.7 million waterfowl winter in Mexico (Gustafson 1990), the counts there, mostly at 5-year intervals, are not readily comparable with the long series from further north. The USSR is treated as equivalent to the Russian Soviet Federal Socialist Republic, ignoring the southern republics, about which there

is less information and from which few waterfowl come to winter in Europe and North America. "Western Palearctic" is used to refer only to the sum of the Northwest Europe and West Mediterranean regions defined by Monval & Pirot (1989), omitting the East Mediterranean region and West Africa (though including Northwest Africa). The data from those important areas are still too sparse to allow annual comparisons with observations from the more intensively studied regions.

Monval & Pirot (1989) presented index trends for the period 1967-86, using 1975 as the base year (1975 index = 100). They chose to perform correlation tests only "on the last 10 years' values, in order to refer only to the most recent trend and to eliminate possible artefacts due to necessary adjustments in counting methods at the beginning of the survey". Their caution is not emulated here, for two reasons. First, the full 20-year run of Western Palearctic records is still awkwardly short for forming a view of trends. Second, their emphasis on the years 1977-86 results in giving most weight to recent decreases in duck numbers, especially in the West Mediterranean. While that may be sensible from some points of view, it leads them to ignore the increases that occurred in the first half of the survey period: a decline following a rise may have different implications than one looked at without regard to what happened previously.

Total numbers of ducks

In the late 1980s, there are believed to have been nearly twice as many ducks breeding in the USSR (75 million) as in North America (32 million). Flint & Krivenko (1990) estimate that there were 80-85 million ducks in the USSR in the early 1960s and 60-65 million in the 1970s, i.e. that in the last 30 years they first fell, then made a partial recovery. They believe that there were perhaps five times as many in the middle of the 19th century as there have been in recent years.

There seem to be no estimates of the total numbers of ducks in North America before the 1930s when, after a severe drought in the prairies had caused anxiety about a great decline, there were believed to be about 65 million in August 1935 (estimate by More Game Birds in America, the precursor of Ducks Unlimited) and 60 million in the autumn of 1939 (Bureau of Biological Survey, Leaflet BS-136). In the years since aerial surveys of the main breeding areas began, the numbers of ducks in May exceeded 60 million in 1955-59 and in the 1970s, when

the "fall flight", including young of the year, was well over 100 million. There are probably fewer ducks in North America now than at any time since European settlement began.

What proportion of Russian-breeding ducks winters in the Western Palearctic, rather than in Africa and Asia, is not yet clear. In mid-winter, there are thought to be nearly twice as many ducks in the USA as in the Western Palearctic (Table 1). The proportion of wintering ducks counted in January is much higher in the USA (18/44 million, 41%) than in the Western Palearctic (5/23 million, 22%).

Table 1. Estimates, in millions, of the numbers of ducks in North America, the USSR and the Western Palearctic in the late 1980s.

	Breeding	Fall flight	Reported kill	January
N. America	42	65	9	44 total 18 count
USSR	75		21	
W. Palearctic				23 total 5 count

Table 1 includes estimates of the reported kill of ducks in the Russian republic and in North America, but none for Europe. The annual North American estimates exclude the kill by indigenous peoples in Alaska and northern Canada, because they are not sampled by the national harvest surveys. In recent years, about 9 million ducks have been killed and retrieved by licensed recreational hunters in Canada and the USA, some 14% of the estimated fall flight. This proportion is misleadingly small, because many of the sea ducks are little shot. The hunting pressure on the Mallard and other popular quarry species is much greater: but that is beyond the scope of this review.

If the productivity of Russian ducks is similar to that of North American ones, leading to an estimated fall flight of 152 million ducks, the estimated kill of 21 million again represents about 14% of the number at the start of the hunting season. The take of Russian ducks in the rest of Europe, Asia and Africa, which cannot yet be guessed at, would have to be added to arrive at the total and the fraction taken by wildfowlers.

Changes in the numbers of ducks

Most seaducks (eiders, scoters, mergansers) are inadequately surveyed, especially in North America,

where they have been of little interest to the agencies responsible for waterfowl management. It therefore seems best to concentrate attention on the Anatini and Aythyini. Figure 1a shows the variations in the annual counts of those two groups in January. The numbers found in the USA have been much larger than in the Western Palearctic and have decreased greatly since 1976. The Western Palearctic counts also peaked in 1976 and have since declined, but much less severely than in the USA, as is displayed more clearly (Fig. 1b) by using index numbers to compare the two series (based on period mean = 100).

Table 2 shows that the recent decline is common to all six American dabbling ducks (*Anas* spp.) and the two scaups (*Aythya marila* and *A. affinis*, which are lumped together in the counts, being hard to distinguish in the field). The last three columns of Table 2 show that in the Western Palearctic the declines since 1976 have not been sufficient to offset the apparent gains from 1967 to 1976, the net result being gains by six of the eight species listed and a sustained decline only of the European Wigeon *Anas*

penelope. (Annual counts of *Aythya marila* were omitted from the report by Monval & Pirot (1989): the mean, of 150,000, is from Pirot *et al.* (1989)).

Table 2. Mean numbers, in thousands, of ducks counted in January, 1967-86 in the USA and the Western Palearctic. Trend = mean annual change as % of period mean; CV = coefft. of variation.

Species	USA			Western Palearctic		
	mean	CV	trend	mean	CV	trend
Mallard	6470	21.9	-2.5	1250	15.8	+1.2
Gadwall	1030	26.4	-1.5	20	35.5	+4.1
Wigeon	1230	24.6	-3.4	620	14.9	-1.0
Green-winged Teal	1330	37.8	-1.7	260	24.9	+3.0
Shoveler	740	24.6	-1.1	120	58.9	+9.3
Pintail	4170	30.2	-1.5	70	22.2	0
Total Anatini	15610	20.2	-2.1	2340	11.7	+1.2
Redhead	470	47.0	0			
Canvasback	280	26.1	+1.9			
Pochard				430	34.9	+2.1
Scaup	1280	31.3	-3.2	(150)	?	?
Ring-necked Duck	170	45.5	0			
Tufted Duck				500	20.3	+2.8
Total Aythyini	2200	18.3	-1.8	1080	?	?

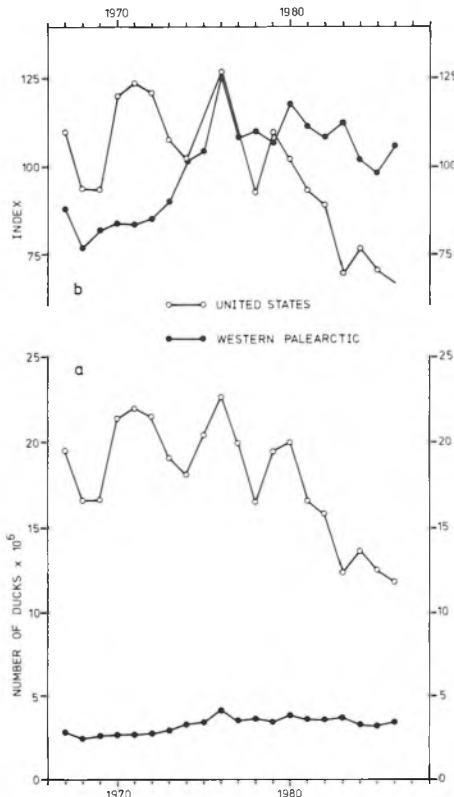


Figure 1. Numbers of surface-feeding and diving ducks counted in January in the USA and in the Western Palearctic, 1967-86: (a) in millions of ducks; (b) converted to index numbers, with period mean = 100.

When the patterns of change in recorded abundance of the three most numerous surface-feeding ducks are compared, using index numbers, there is no resemblance between the changes in the numbers of Mallard *Anas platyrhynchos* in the Western Palearctic and in North America. From 1970 to 1982 the two wigeon, *A. penelope* and *A. americana*, declined at similar rates. Though the European Green-winged Teal *A.c. crecca* was increasing while the American race was decreasing, both underwent large fluctuations. Similarly large swings had been seen in both regions in the 1950s and 1960s.

The pochards (Aythyini) have also long been known to vary widely in numbers, the recurring scarcity of Canvasbacks in North America having attracted a lot of attention. While there have been some large changes in the numbers of each species found in successive years, the most interesting common features of the index curves (Figure 2) are the interval of 9-11 years between each trough and peak, and the indication that the moving average numbers of the European Pochard and the Redhead have tracked each other closely.

There are no North American equivalents of the Ferruginous Duck *A. nyroca* and the Red-crested Pochard *Netta rufina*, both scarce southern-breeding species in Europe, with larger but dwindling stocks further east.

During 1967-86 the Tufted Duck *Aythya fuligula* continued to increase in the Western Palearctic, as it has done throughout the 20th century (Cramp &

Simmons 1977). Its counterpart in eastern North America, the Ring-necked Duck *A. collaris*, has also expanded its breeding range during this century. The standard January counts show no sustained trend since 1967, the reported numbers declining from

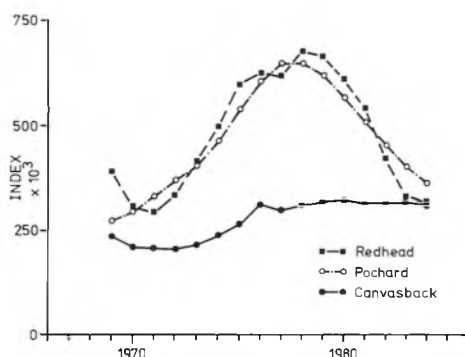


Figure 2. Annual changes in the relative abundance of Canvasback and Redhead in the USA and of Pochard in the Western Palearctic in January, 1967-86: 4 point moving averages of index numbers, with period mean = 100.

1969 to 1980 before increasing rapidly through the 1980s. However, a detailed analysis of the counts in the southern states of the Atlantic Flyway (Montalbano *et al.* 1985) showed that the apparent decline in the winter counts during 1950-83, in conflict with evidence of increase in the breeding range (Palmer 1976), was almost wholly explicable by variations in the numbers found in Florida, which resulted from changes in survey routes and in survey effort. After adjustment for those biases there appeared to have been a sustained increase in the numbers of Ring-necked Ducks, of perhaps as much as 5% per annum. (This case of biased surveying is believed to have been exceptional.)

Discussion

Many comparisons could be made between the changes in duck numbers in the Western Palearctic and in North America. The loss of ducks from the Canadian prairies, formerly the most important duck-producing region of North America, seems to be due to extremely poor nesting success during a period dominated by prolonged drought. The drought has worked in two ways. Most obviously it has led to losses of small ponds and the temporary drying up of larger lakes: though there is no evidence that the supply of ponds in the 1980s is insufficient for the greatly depleted duck population. The serious damage to ducks seems to have been done by the ploughing up of former ponds made possible by the drought, by the

clearing away of most potential nesting cover for the easier operation of big machines, and by the remaining nesting cover being so sparse that it can easily be searched by predators such as raccoons, which have greatly increased.

The questions of greatest interest at this stage are (1) whether the greatly depleted duck population of the Canadian prairies can be restored to its former level, and (2) whether the recent decline in the Western Palearctic, particularly in the Mediterranean sub-regions, is likely to have been brought about by a situation of comparable severity in parts of the Russian breeding range, or reflects, more directly, the deterioration of wintering habitats?

A Prairie Habitat Joint Venture is now beginning to be funded by Canadian and American agencies, after a great deal of effort to secure financial commitment to the goals of the North American Waterfowl Management Plan, signed in 1986. The project is ambitious, involving the planned expenditure of about 900 million dollars by the year 2000, with a peak of 180 million dollars in 1997. Yet it is clear that direct attack, by acquisition and restoration of damaged wetlands by organizations with strong interests in conservation, cannot deliver all that is needed. It is the future course of prairie farming that will be decisive; and that will be determined by intense international competition for the world market for cereal grains. Until recently the USA and Canada were two of the strongest players, but their positions have weakened. Climate modellers predict further drying-up of north-central North America as a likely consequence of climate warming. That would have direct damaging effects on ducks, as have been seen in the 1980s and in previous droughts; and also less predictable indirect effects, through a reshaping of agriculture. Thus the success of the Prairie Habitat Joint Venture is far from assured, despite the success of the fight to secure the funds that will allow it to be carried out.

It is much less clear what needs to be done, where and by whom, to reverse the very recent slump in duck numbers in the Western Palearctic. Perhaps the chief use of this crude set of comparisons between the recent changes in waterfowl populations in two continents may be to help focus attention on "problem identification" as a necessary prelude to "problem solving". That could be much the best way to justify the great efforts being put into counting ducks and geese in North America and Europe. The merits of inter-continental comparisons of changes in the numbers of different species of waterfowl would be clearer were it possible to

go beyond seeing vague resemblances in the shapes of graphs. That will not be easy. Before more thorough analyses can be accomplished it will be necessary to have much better understanding of what is being compared with what. Duck populations are far harder to work with than those of geese. Few, if any, large duck populations seem to be closed units. The relatively long series of winter counts in the USA have been little used for studies of long-term change, except in the politically-active case of the long slow decline of the Black Duck (Rusch *et al.* 1990). A recent study, comparing the standard winter counts of Black Ducks with the results of an experimental aerial survey covering large parts of the winter range along the US Atlantic coast, found an encouragingly good fit between the estimates for four winters at the flyway level (Conroy *et al.* 1988).

Much more validation of winter counts needs to be carried out, in the Western Palearctic as well as in North America. But it is tedious and expensive, so likely to be attempted only when

there are strong pressures to confirm or reject results that might have practical implications. On such controversial issues as the impact of shooting on duck populations, tracking changes in continental numbers can be of little help. In the more important matter of reducing the harmful impacts of human activities on wetlands and their inhabitants, the evidence provided by large-scale long-term counts is unlikely to be helpful in most site-specific cases, though it may be when the development activities themselves are on a very large scale, such as the existing and proposed hydro-electric developments in northern Quebec and the USSR.

What continental counts can do, better than anything else, is to provide a general background, against which the consequences of particular local activities can be judged, and which may draw attention to neglected large-scale changes, for which causes can be sought. These are not spectacular functions, but they are important ones, particularly because no substitutes for the waterfowl-counting networks exist.

References

- Bartonek, J.C. 1989. Status of waterfowl, cranes, and other water birds in North America. Pp. 64-75 in: H. Boyd & J-Y. Pirot (Eds.) *Flyways and reserve networks for water birds*. IWRB Special Publ. 9. Slimbridge, England.
- Conroy, M.J., Goldsberry, J.R., Hines, J.E. and Stotts, D.B. 1988. Evaluation of aerial transect surveys for wintering American Black Ducks. *J. Wildl. Manage.* 52:694-703.
- Cramp, S. & Simmons, K.E.L. (Eds.) 1977. *The Birds of the Western Palearctic, Vol. 1*. The University Press, Oxford.
- Curtis, S.G., Dennis, D.G. & Boyd, H. (Eds.) 1984. Waterfowl studies in Ontario, 1973-81. *Can. Wildl. Service Occas. Paper* 54:1-69.
- Flint, V.Ye. & Krivenko, V.G. 1990. Waterfowl breeding in the USSR: size of stocks and factors influencing their production. In: *Managing Waterfowl Populations*, Proc. IWRB Symposium, Astrakhan (USSR), October 1989. IWRB Special Publ. 13.
- Gustafson, E.W. 1990. The Mexican waterfowl harvest: legal and illegal. In: *Managing Waterfowl Populations*, IWRB Symposium, Astrakhan (USSR), October 1989. IWRB Special Publ. 13.
- Montalbano, F. III, Johnson, F.A. & Conroy, M.J. 1985. Status of wintering Ring-necked Ducks in the southern Atlantic Flyway. *J. Wildl. Manage.* 49:543-546.
- Monval, J-Y. & Pirot, J-Y. (Compilers) 1989. *Results of the IWRB International Waterfowl Census 1967-1986*. IWRB Special Pubn. 8. IWRB, Slimbridge, England.
- Palmer, R.S. (Ed.) 1976. *Handbook of North American Birds. Volume 3. Waterfowl (Part 2)*. Yale University Press, New Haven, Conn.
- Pirot, J-Y., Laursen, K., Madsen, J. & Monval, J-Y. 1989. Population estimates of swans, geese, ducks, and Eurasian Coot *Fulica atra* in the Western Palearctic and Sahelian Africa. Pp. 14-23 in: H. Boyd & J-Y. Pirot (Eds.) *Flyways and reserve networks for water birds*. IWRB Special Publ. 9. IWRB, Slimbridge, England.
- Rusch, D.H., Ankney, C.D., Boyd, H., Longcore, J.R., Montalbano, F. III, Ringelman, J.K. & Stotts, V.D. 1990. Population ecology and harvest of the Black Duck: a review. *Wildl. Soc. Bull.* 17:379-406.
- Hugh Boyd, Migratory Bird Research Division, Wildlife Toxicology and Surveys Branch, Canadian Wildlife Service, National Wildlife Research Centre, Ottawa, Ontario K1A 0H3, Canada.