

Acid Rain

GLEN C. SANDERSON

STATEMENT ON ACID RAIN AND WATERFOWL

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For almost three decades waterfowl biologists have sought the cause(s) of the steady decline of the black duck in eastern North America. Several theories have been proposed and examined: (1) The black duck gene pool is being swamped by the mallard to the extent that mallards have replaced black ducks in some habitats and parts of its range. (2) The black duck is being overharvested. (3) The black duck has suffered unusually high losses from lead poisoning.

We have examined each of these theories and found insufficient evidence to support their validity in their entirety. True, the black duck gene pool is being invaded by mallard genes, but the gain in mallard numbers in the black duck's range, has not compensated for the loss in black duck population. Combining the winter populations of both species in the Atlantic Flyway (data from winter inventories of the U.S. Fish and Wildlife Service), 1953-1987, there has been a decline of 54.5 percent in both species during that period. In New England the decline amounted to 13.6 percent because of a 96.6 percent increase in mallard numbers. Black ducks declined 21.5 percent in New England and 58.7 percent in the Atlantic Flyway (Fig. 1). Most of the mallards frequenting the Atlantic Flyway originate from breeding grounds in Ontario, Quebec, and the Maritimes, east of the important prairie breeding grounds so famous for game ducks.

Black ducks in the Mississippi Flyway have declined 72.2 percent during the period, 1953-1985. Mallards declined 64.6 percent, but these

mallards originated largely on the wetlands of the northern prairies, known in recent years for their degradation by agriculture and drought. But the black ducks of the Mississippi Flyway originate in the Boreal and Great Lakes forest area either north or east of the northern prairies.

Thus black ducks breed sparingly over a vast area of eastern Canada (85 percent) and northeastern United States (15 percent), a region not subject to drought or to serious impact by agriculture. Although gene swamping by the mallard has exploited a small part of the black duck population, most of the black duck population is still intact. Moreover, populations of both species combined have declined dramatically in the Atlantic Flyway where they occupy common breeding grounds.

Hunting, through overharvest, has not been responsible, in my opinion, for the steady decline of black ducks for over three decades. Figure 2 shows trend lines in the black duck kill, 1955-1985, for the Atlantic and Mississippi flyways. The decline in the black duck kill has followed fairly closely that of the population decline. It dropped 36.0 percent and 72.8 percent, respectively, in the Atlantic and Mississippi flyways.

Band recovery data that I have examined do not disclose that hunters are harvesting an unrealistic proportion of the black duck population. First year recovery rates are similar to the mallard and the wood duck. The mallard decline has not been associated with overharvest. The wood duck population has shown a steady increase for more than 25 years.

Black ducks show a moderate level of lead shot ingestion that has not varied significantly during the last 25 years. Black ducks have a higher protein diet than mallards, feeding much more extensively on animal foods. The higher the protein in a duck's diet, the greater the potential for the toxic lead salts to be eliminated before they adversely affect the blood,

sympathetic nervous system, brain, liver, and kidneys. Our expertise in this area of research leads us to conclude that the steady decline in black duck numbers is not related to excessive and incremental losses from lead poisoning.

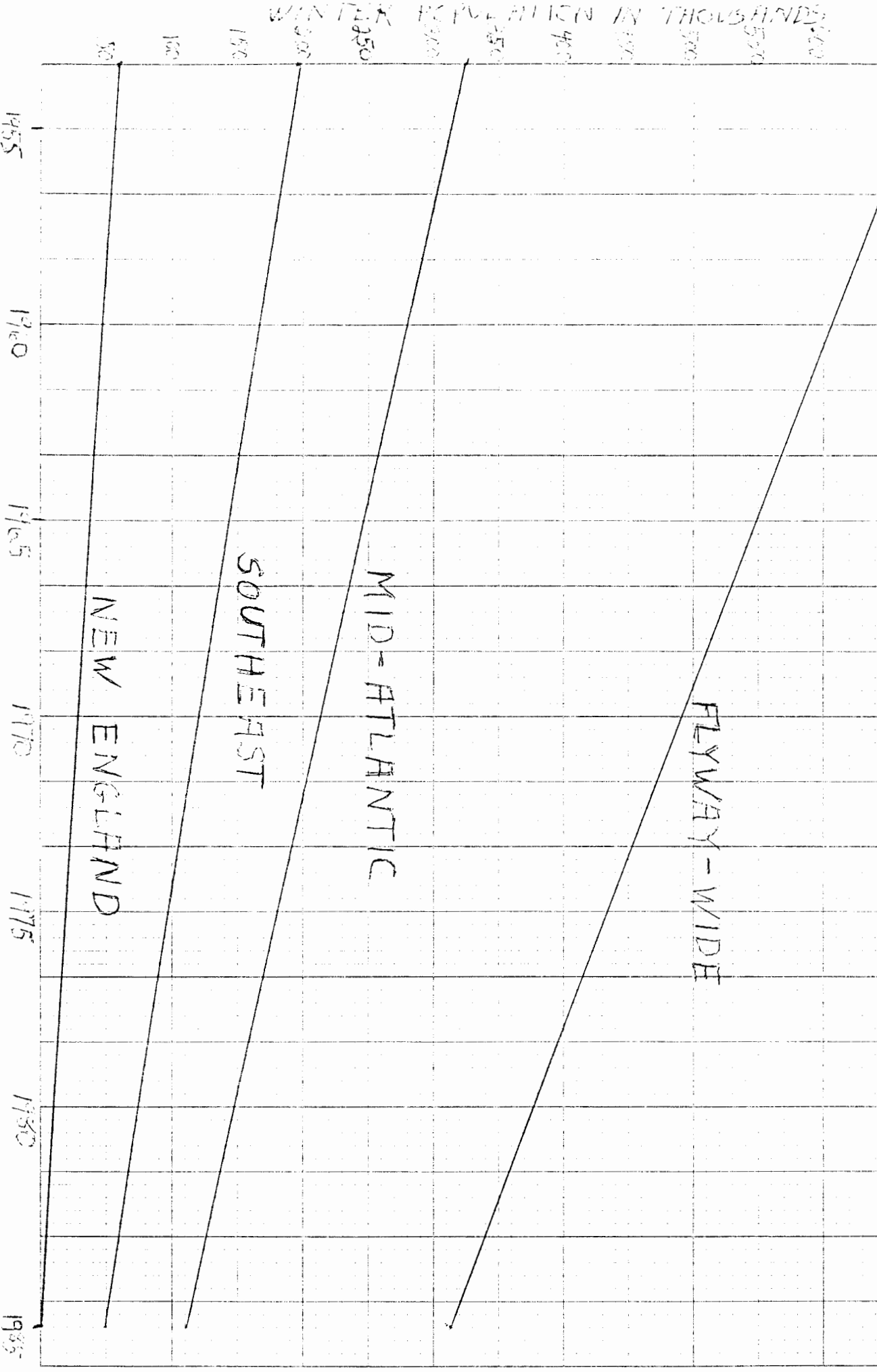
Not one of the several theories proposed about factors responsible for the black duck decline proved tenable until the theory of acid rain, operating through the food chain, was proposed. It was first brought to my attention by Mr. Paul W. Hansen, Izaak Walton League of America, who asked me to review a draft manuscript he had prepared. A perusal of the data presented from aquatic invertebrate studies by Canadian and United States biologists convinced me of its plausibility. A reduction in the invertebrate food resources of prelaying black duck hens and in these same resources required for the first month of duckling development would negatively impact both reproductive and survival rates. These declines would immediately affect the population level because of the high mortality rates that the black duck--and all game ducks for that matter--experience.

To date the theory of acidification of water areas in the black duck's breeding range is the only theory that offers a plausible explanation for what has happened to the black duck in time and in space. It seems folly not to pursue this problem with imagination, initiative, and vigor.

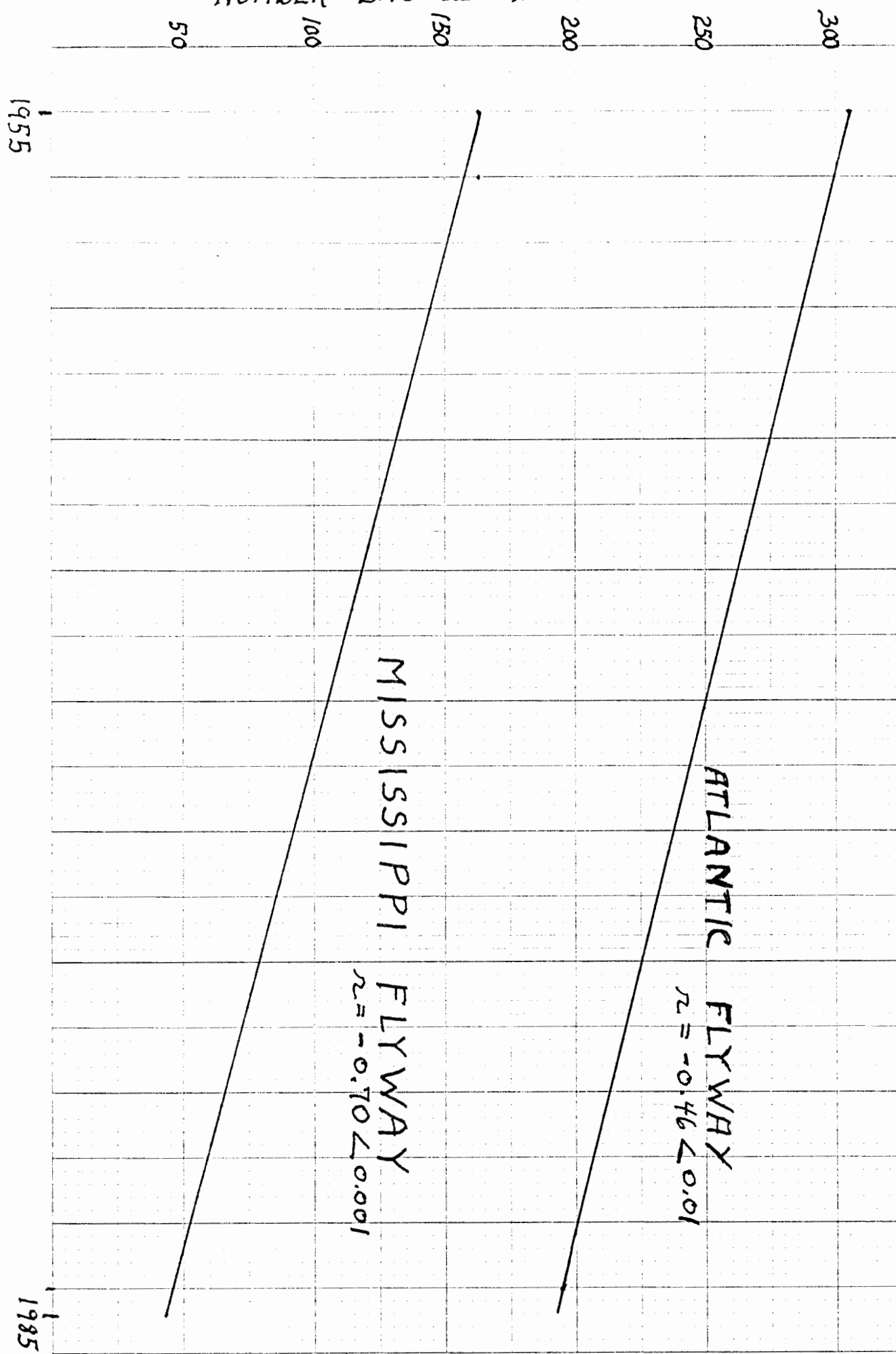
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TREND IN HALLARD-BLACK DUCK WINTER POPULATIONS

ATLANTIC FLYWAY, 1954-1985



ESTIMATED THIRD WING BLACK DUCKS BAGGED 1955 - 1985



ATLANTIC FLYWAY
 $r = -0.46 < 0.01$

MISSISSIPPI FLYWAY
 $r = -0.70 < 0.001$

1955

1985

Dear Glen,

Improve this statement as
much as your time and energy permits.

Send it the most speedy way
to: Mr. Paul W. Hansen,
Isaac Walton League of America
11701 North Ft. Meyer Drive
Suite 1100

703-528-1818 Arlington, Va. 22209

The Federal Express number
for charging the shipment to the
ISAAC WALTON L. is:

1223-9374-7

They will provide container
and label for shipment.

An important contribution
that we both can help the IKES.

Thanks so much, Glen. Will
be in touch on Wednesday.

Frank