

Food Habits of Canvasbacks in the Northeast

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Abstract:

The food habits of canvasbacks (Aythya valisineria) in the Northeast were studied during the 1970's to determine current food preference of this species. Wildcelery (Vallisneria americana) was the predominant food in birds from upstate New York, whereas invertebrates predominated in the diet of birds from coastal areas. These data appear similar to historical data of canvasback food habits, except for Delaware River and Delaware Bay areas. During a 28-year period (1955-1982), an average of 19% of the Atlantic Flyway canvasback population has wintered in the Northeast. New York has wintered the greatest number of these birds overall, but during the last 10 years, New Jersey has had the most canvasbacks of any State in the Northeast. The Northeast apparently still has adequate habitat for canvasbacks and has not suffered the major habitat changes that have occurred in Chesapeake Bay.

Introduction:

Recent studies of wintering waterfowl in Chesapeake Bay have attempted to show a relationship between the distribution of waterfowl and the distribution of their major food organisms (Munro and Perry 1981, Perry et al. 1981). Special emphasis has been placed on the importance of submerged aquatic vegetation as a waterfowl food. The canvasback (Aythya valisineria) was one species that showed major changes in its food habits during a 90-year period (1890-1979). Historic reports (Bent 1923, Cottam 1939) indicated that canvasbacks were primarily vegetarians and especially

relished wildcelery (Vallisneria americana). Cottam (1939) stated that the canvasback was "perhaps more a digger of roots and other subterranean plant parts than any other of its tribe." Perry (1982), however, found that during the 1970's vegetation constituted only 3% of the canvasback's diet, and wildcelery was found in only trace amounts.

Data from mid-winter aerial waterfowl surveys are useful to show population trends and distribution of some species (Larned et al. 1980). Perry (1982) found that significant population changes of canvasbacks have occurred in Susquehanna Flats and Eastern Bay which also have experienced major declines in vegetation (Kerwin et al. 1976, Bayley et al. 1978).

Concurrent with the collection of canvasbacks for the Chesapeake Bay study, canvasbacks were obtained from the Northeastern States to determine if similar changes in food habits were occurring in other areas. This report presents the results of those food habits studies and compares them to historic canvasback food habits. The assistance of State personnel in the collection of data for this report is appreciated. G. M. Haramis and R. Munro reviewed drafts of this manuscript.

Techniques:

Canvasbacks used in food habits studies were obtained by shooting birds at night from a slowly moving boat, from legal hunting, or from confiscated birds from illegal hunting. Gullet (esophagus and proventriculus) and gizzards were analyzed and the volume of major food organisms was determined for each sample. Average volume and the frequency of occurrence were tabulated. Perry (1982) found that food in the gizzard of canvasbacks was closely correlated with gullet food and was adequate to show trends in food habits.

Aerial waterfowl survey data from 1955 to 1982 were used in this report. These data were obtained from January surveys conducted by U.S. Fish and Wildlife Service and cooperating States of all major waterfowl wintering habitat in the Northeast. They are used to show long-term trends and are presented as 3-year running averages to minimize annual fluctuations.

Results:

Gullet and gizzard samples collected during the 1970's came from 4 areas of the Northeast: New York (n=15), New Jersey (n=18), Delaware (n=3), and Pennsylvania (n=5). New York samples were from legally killed canvasbacks from hunters and only included gizzards. Delaware birds were confiscated by law enforcement personnel and included gullet and gizzard material as did the scientific collections from New Jersey and Pennsylvania.

Birds from New York came from the Niagara River area and from the Finger Lakes. Vegetation was the predominant food from both areas (Table 1). The winter buds and rootstocks of Vallisneria americana formed 68% of the food from the Niagara River and 33% from the Finger Lakes. Other plants of measurable quantities from the Finger Lakes included Sparganium sp., Potamogeton nodosus, and Myriophyllum verticillatum.

Fingernail clams (UNIONIDAE) formed 19% of the food volume from both areas and was eaten by 40% of the birds. Fingerling alewives (Alosa pseudoharengus) constituted 12% of the food from the Niagara River area. Alewives were unintentionally introduced into Lake Ontario when shad (Alosa sapidissima) were stocked in the early 1900's. Alewives multiplied in great numbers and annual spring dieoffs of this species often cause a

nuisance (Hubbs and Lagler 1970). They have now spread to the Finger Lakes, but were not recorded in this sample of birds from these Lakes.

Canvasbacks were collected in 3 areas of New Jersey (Table 2).

The soft-shelled clam (Mya arenaria) was the predominant food in the gizzards of birds from Shrewsbury River and Raritan Bay. Macoma balthica was also an important food in the Shrewsbury River. In the Toms River, Macoma balthica formed 100% of the food and was found in all of the birds.

The only plants found in the New Jersey sample of canvasbacks was red algae (RHODOPHYCEAE) which was found in trace amounts from the Shrewsbury sample. These 18 birds from New Jersey demonstrate the importance of invertebrates in this coastal area.

The amphipod, Leptocheirus plumulosus, constituted 89% of the gullet food and 60% of the gizzard food in 3 birds from coastal Delaware (Table 3). Sea lettuce (Ulva lactuca) was also an important food forming 33% of the gizzard food. Macoma balthica and Macoma mitchelli formed measurable food items in both the gullet and gizzard samples.

The fingernail clam (Sphaerium transversum) formed 80% of the gullet food and 69% of the gizzard food in birds from Darby Creek, Pennsylvania (Table 4). Tubificid worms (OLIGOCHAETA) formed 20% of the food volume of the gullet and gizzard. Mya arenaria and the mud snail (Nassarius obsoletus) were 2 other invertebrates found in the gizzard in measurable quantities.

Midwinter aerial waterfowl surveys, conducted each year from 1955 to 1982, have recorded canvasbacks in all Northeast States except Maine and New Hampshire. Population estimates have ranged from 14,800 in 1969 to 50,400 in 1976, with a 28-year average of 24,400 (Fig. 1). New York has wintered the most canvasbacks in the Northeast with an average estimated

population of 11,200 followed by New Jersey with 8,700. These 2 States have wintered an average of 81% of the canvasbacks in the Northeast during the 28-year period. The percent of canvasbacks in the Atlantic Flyway wintering in the Northeast has increased whereas the percent in Chesapeake Bay has decreased (Fig. 2).

The distribution of canvasbacks has been fairly stable during the 28-year period. From 1955 to 1972, New York wintered more canvasbacks than New Jersey except for 1 year (1967). In 1973, however, New Jersey recorded 7 times the number of canvasbacks found in New York and since that time has maintained the position of the most important canvasback wintering area in the Northeast.

Discussion:

The present food habits and distribution of canvasbacks in New York appear to be similar to historical accounts. Large flocks of canvasbacks (200-1,000) were reported on the Finger Lakes from the winter of 1897-98 to the winter of 1901-02 (Anon. 1909). They remained on the Lakes from the 1st of December until early March. In February 1899, large numbers of canvasbacks were killed on Canandaigua Lake at "air openings" in the ice. Most of the birds were emaciated and some were picked up in a starving condition, indicating that their feeding areas had been covered by ice for a prolonged period. The same report stated that the canvasback was not a common duck in any portion of the State and was a rare migrant throughout the Hudson-Champlain Valley and the coastal region of New York

An older report (Giraud 1844), however, stated that canvasbacks were frequently shot in Great South Bay, New York City. Those procured in the vicinity of New York City were inferior in taste to those from Chesapeake Bay due to the quality of their food. Giraud (1844) infers that canvasbacks

in the New York City area fed on shellfish and various marine plants, but not wildcelery.

Although no canvasbacks in this study were obtained from New York City, 4 birds were collected from Raritan Bay, New Jersey. These birds had all fed on Mya arenaria which formed 100% of the food volume. Cutright (1976) found that Mya arenaria formed 84% of the food of 24 canvasbacks from Upper New York Bay during the 1975-76 winter. Based on available historical reports, canvasbacks in New York probably were always most numerous on the Finger Lakes where they fed on plants and less numerous in the coastal areas where they fed on mulluscs, especially Mya arenaria.

Stone (1937) indicated that the canvasbacks were uncommon in New Jersey during the 1920's and 1930's. One report of 2,000 in Barnegat Bay in 1927 was unusual. Wilson (1814) stated that large flocks of canvasbacks were attracted to the entrance of Egg Harbor where a vessel loaded with wheat (Triticum aestivum) was wrecked. Local gunners killed as many as 250 in 1 day, but were unfamiliar with the duck and sold them for only 12.5 cents a pair. They called them "sea ducks" and were unaware that they were valued at over \$2 a pair.

Only 1 record of a canvasback from New Jersey was in the Patuxent Wildlife Research Center food habits file. The bird was shot in Ocean County and its food was totally invertebrate with pelecypods forming 89% of the volume and gastropods forming 11%. The present day canvasback in New Jersey is an invertebrate feeder and may have always been one in this area. There is no explanation why the canvasback population has increased in New Jersey during the 1970's and 1980's.

Warren (1890) reported that in Pennsylvania the canvasback was only an occasional winter visitor on the Susquehanna River, south of

Harrisburg, but a frequent spring and fall migrant. Todd (1940) reported that the canvasback is a common visitor to Erie Bay, Conneaut Lake, and Pymatuning Lake.

No historical records of the food habits of canvasbacks in Pennsylvania was found. Warren (1890), however, stated that redheads (Aythya americana) collected from Brandywine Creek near West Chester, Pennsylvania had fed on wildcelery, which was a "common, though not abundant plant in this locality." Canvasbacks collected in the present study had fed only on invertebrates (clams and tubificid worms). Stark (1978) found that ruddy ducks (Oxyura jamaicensis) had fed predominantly on tubificid worms. No record of wildcelery was found in the birds or in any of the bottom samples from this area.

Although no birds were collected from New England in this study, there are some historical records of their food habits. Four New England canvasbacks in the Patuxent Wildlife Research Center food habits file had fed on wildcelery (62% of volume) and pondweeds (Potamogeton spp.) (33% of volume). Palmer (1949) reported that canvasbacks were occasionally shot in Maine and that its status had not changed from 1874 to 1949. Gould (1896) reported that a male shot in October 1896 in Penobscot County had eaten wildcelery.

Cronan and Halla (1968) found that plant material constituted 100% of the food of canvasbacks from Rhode Island. No record of food habits of canvasbacks in Connecticut was obtained. Sage et al. (1913) reported that canvasbacks were "a very rare accidental winter visitor."

Forbush (1929) stated that the canvasback was a rare migrant in the 3 northern New England States. It was reported in Vermont on Lake Champlain, but not recorded in New Hampshire. It is less rare in 3 southern New

England States and growing more common (since 1904) in southwestern Massachusetts, but rarely wintering in Massachusetts. On Martha's Vineyard it was reported on freshwater ponds that support wildcelery and pondweeds (Fay 1910).

In general, canvasback populations in the Northeast have maintained remarkably stable populations over a long period and in fact, show some signs of increasing. Food habits of these birds appear to be similar to historical records and therefore do not indicate major habitat changes in this region. The Delaware River and Delaware Bay have probably suffered more canvasback habitat loss of any of the areas in the Northeast. The historic use of the area by canvasbacks, however, seems to be limited and probably insignificant compared to historic use of Chesapeake Bay. The Northeast apparently still has adequate habitat for canvasbacks and has not suffered the major habitat changes that have occurred in Chesapeake Bay.

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Table 1. Gizzard contents of canvasbacks from New York, Nov.-Dec. 1977¹

	Niagara River n=10	Finger Lakes n=5	Total New York n=15
<u>Animal Food</u>			
UNIONIDAE	19(40)	19(40)	19(40)
<u>Alosa pseudoharengus</u>	12(10)		8(7)
BELOSTOMATIDAE	tr(10)	6(20)	2(13)
<u>Campelema</u> sp.	1(20)		tr(13)
<u>Helisoma</u> sp.	tr(30)		tr(20)
GASTROPODA		tr(40)	tr(13)
<u>Goniobasis</u> sp.		tr(20)	tr(7)
Fish Bones	tr(10)		tr(7)
Percent Animal Food	32%	25%	29%
<u>Plant Food</u>			
<u>Vallisneria americana</u>	68(70)	33(40)	55(60)
<u>Sparganium</u> sp.		20(20)	8(7)
<u>Potamogeton nodosus</u>		17(40)	7(13)
<u>Myriophyllum verticillatum</u>		3(20)	1(7)
<u>Scirpus acutus</u>	tr(10)	1(40)	tr(20)
<u>Scirpus validus</u>		1(40)	tr(13)
<u>Carya</u> sp.	tr(10)		tr(7)
<u>Calidium mariscoides</u>		tr(20)	tr(7)
<u>Eleocharis</u> sp.		tr(20)	tr(7)
<u>Potamogeton pectinatus</u>	tr(10)		tr(7)
<u>Potamogeton pusillus</u>	tr(10)	tr(20)	tr(13)
Percent Plant Food	68%	75%	71%
Ave. Food Volume (cc)	4.2(41%)	1.9(33%)	3.3(38%)
Ave. Grit Volume (cc)	6.1(59%)	3.9(67%)	5.3(62%)
Total Contents (cc)	10.3(100%)	5.8(100%)	8.6(100%)

¹ Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as tr.

Table 2. Gizzard contents of canvasbacks from New Jersey, winters 1976-77 and 1977-78.¹

	Shrewsbury River n=6	Raritan Bay n=4	Toms River n=8	Total New Jersey n=18
<u>Animal Food</u>				
<u>Mya arenara</u>	64(66)	100(100)		44(44)
<u>Macoma balthica</u>	34(50)	tr(25)	100(100)	56(67)
<u>Nereis sp.</u>	1(83)		tr(38)	tr(44)
<u>Rhithropanopeus harrisi</u>	1(33)			tr(11)
<u>Neopanope texana sayi</u>	tr(17)	tr(25)		tr(11)
<u>Panopeus harbstii</u>	1(17)			tr(6)
<u>Mulinia lateralis</u>	tr(17)			tr(6)
<u>Balanus sp.</u>	tr(17)			tr(6)
<u>Nassarius obsoletus</u>	tr(17)			tr(6)
Percent Animal Food	100%	100%	100%	
<u>Plant Food</u>				
RHODOPHYCEAE	tr(17)			tr(6)
Percent Plant Food	tr	0%	0%	
Ave. Food Volume (cc)	6.6(100%)	10(100%)	7.0(100%)	7.6(100%)
Ave. Grit Volume (cc)	tr	tr	tr	tr
Total Contents (cc)	6.6(100%)	10(100%)	7.0(100%)	7.6(100%)

¹ Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as tr.

Table 3. Gullet and gizzard contents of canvasbacks from Pepper Creek,
 Delaware, 20 Dec. 1978¹

	<u>Gullet</u> (n=3)	<u>Gizzard</u> (n=3)
<u>Animal Food</u>		
<u>Leptocheirus plumulosus</u>	89(67)	60(67)
<u>Macoma balthica</u>	1(33)	3(33)
<u>Macoma mitchelli</u>	10(33)	3(33)
<u>Macoma sp.</u>		tr(33)
<u>Morone americana</u>		tr(33)
<u>Nassarius sp.</u>		tr(33)
<u>Retusa canaliculata</u>		tr(33)
ASTACIDAE	tr(33)	
Percent Animal Food	100%	66%
<u>Plant Food</u>		
<u>Ulva lactuca</u>		33(33)
<u>Cladium mariscoides</u>	tr(33)	tr(67)
<u>Cornus florida</u>		tr(33)
<u>Phytolacca americana</u>	tr(33)	tr(33)
<u>Pinus sp.</u>		tr(33)
<u>Potamogeton sp.</u>		tr(33)
<u>Proserpinaca palustris</u>		tr(33)
<u>Scirpus robustus</u>		tr(33)
<u>Scirpus validus</u>		tr(33)
Percent Plant Food	tr	33%
Ave. Food volume (cc)	2.5(100%)	4.7(62%)
Ave. Grit Volume (cc)	0	2.9(38%)
Total Contents (cc)	2.5(100%)	7.6(100%)

¹ Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as tr.

Table 4. Gullet and gizzard contents of canvasbacks from Darby Creek, Pennsylvania, winter 1976-77.¹

	<u>Gullet</u> (n=5)	<u>Gizzard</u> (n=5)
<u>Animal Food</u>		
<u>Sphaerium transversum</u>	80(80)	69(80)
<u>OLIGOCHAETA</u>	20(20)	20(20)
<u>Mya arenaria</u>		10(40)
<u>Nassarius obsoletus</u>		1(20)
<u>COLLEMBOLA</u>		tr(20)
<u>FORMICIDAE</u>		tr(20)
Percent Animal Food	100%	100%
<u>Plant Food</u>		
<u>Carex spp.</u>		tr(20)
<u>Cyperus strigosus</u>		tr(20)
<u>Digitaria sanguinalis</u>		tr(20)
<u>Elodea canadensis</u>		tr(20)
<u>Lemma minor</u>		tr(20)
<u>Phragmites communis</u>		tr(20)
<u>Polygonum arifolium</u>		tr(20)
<u>Polygonum aviculare</u>		tr(20)
<u>Polygonum punctatum</u>		tr(20)
<u>Sagittaria latifolia</u>		tr(20)
<u>Stellaria sp.</u>		tr(20)
<u>Vitis sp.</u>		tr(20)
Percent Plant Food	0%	tr
Ave. Food volume (cc)	11.6(100%)	6.3(77%)
Ave. Grit Volume (cc)	0	1.9(23%)
Total Contents (cc)	11.6(100%)	8.2(100%)

¹ Quantities represent percent by volume of food material. Percent by occurrence in parentheses. Volume of less than 0.5 percent represented as tr.

Figure 1. Three-year running average populations of canvasbacks in the Atlantic Flyway and Northeast, 1955-1982.

Figure 2. Three-year running average of percent of Atlantic Flyway canvasbacks wintering in Chesapeake Bay and the Northeast, 1955-1982.



