

BLUE AND SNOW GEESE IN EASTERN UNITED STATES
IN THE WINTER OF 1934-35—WITH NOTES ON
THEIR FOOD HABITS.

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THE BLUE GOOSE (*Chen caerulescens*) is unique in its peculiarly restricted distribution and migration. It breeds in the southwestern part of Baffin Island and on Southampton Island and possibly in other parts of the arctic tundra; indeed, a recent but unconfirmed report indicates the discovery of a limited number of birds nesting in the vicinity of Lake Winnipeg, Manitoba. In southward migration it follows a circuitous course from Hudson Bay to the Mississippi Valley and southward to a remarkably restricted zone on the Gulf coast of Louisiana, with the main concentration from the delta of the Mississippi River to Vermilion Bay. In this confined area it is astonishingly abundant. It occurs in smaller numbers on the Texas coast as far south as Brownsville.

The southward migration flight seems to be a tremendous one with few or no stopovers. During the southward migration records of occurrence of this species in the Mississippi Valley are comparatively uncommon, indicating that the majority of individuals make a non-stop flight over the United States, traveling steadily on until they reach their chosen winter resort.

These facts have made the bird but little known, even to most ornithologists, and for many years it was regarded as a rare species or possibly only a peculiar color phase of its closest relative, the Snow Goose (*Chen hyperborea*).

In migration the Blue Goose seldom straggles far from its accustomed route down the Mississippi Valley. Until the winter of 1934-35 there were comparatively few records of the species in the East, and a number of the coastal States had no records at all. Since November 1934, however, it has been observed in Massachusetts and in every state from New York southward to Georgia, except Delaware.

MASSACHUSETTS.

The number of records in Massachusetts during November strongly suggests that its occurrence in other New England States has been overlooked. Frederic A. Kennard, Director of the Boston Society of Natural History, and others have written of a Blue Goose shot at the Point Gunning Stand at Plymouth Beach, Plymouth, on November 3, 1934, by Harry A. Bradford. The bird is reported to have come into the stand alone, flying high, and calling and circling over his decoys. It then lit outside the decoys

and swam part way in to the stand, then flew up and passed over the decoys within gun range and was killed and mounted as a specimen.

Joseph A. Hagar, ornithologist of the Massachusetts Department of Conservation, wrote under date of April 2 that on November 6 at Harwich, Cape Cod, a single adult Blue Goose came to live with Black Duck decoys at Grass Pond and was shot by Hilary Leclair. The bird was eaten, but its head and wings were retained as convincing evidence of its identity. Mr. Hagar further reports that early in November three of these birds stayed several days with the Canada Goose decoys of F. B. Magathlin, in Sachacha Pond, Nantucket Island. They then disappeared for a day or two and finally one came back alone. This bird refused to leave the decoys and when the latter were removed to winter quarters on Mr. Magathlin's farm about a mile away, it was taken along. The bird, which was immature, was placed with the decoy Canada Geese in an open pen, where it was free to leave at any time. Late in January the State Game Department had the bird taken to the Middlesex Fells Zoo at Stoneham.

In a recent issue of the 'Bulletin' of the Essex County Ornithological Club [No. 16, p. 23, Dec. 1934], S. T. Emilio writes that a fine adult specimen of the Blue Goose was taken at Ipswich on November 10 by Harold Raymond and was mounted. The bird is reported to have been previously wounded. Mr. Emilio states that this was the third specimen known to have been taken in Essex County.

Charles S. Safford, Superintendent of the Plum Island Bird Sanctuary, reports that seven Blue Geese were seen on the island on November 10, although not by him personally. He further states that on this same day some were seen at Rowley and one was shot at Ipswich. This Ipswich record undoubtedly is the same as the one above referred to. On March 17 Mr. Safford wrote that Earl Stanwood, of West Gloucester, observed two of these Geese at a small pond in Essex and collected one of them. The other bird was said to have been seen on several occasions afterwards at this same pond looking for its mate.

Seth A. Low, of the Austin Ornithological Research Station, at North Eastham, has written that on December 9 a lone Blue Goose was captured at Yarmouth, Cape Cod, by Graham Pulsifer. The bird seemed to be nearly exhausted and alighted among a flock of decoys. It was taken to the Ornithological Station, where Mr. Low banded it and placed it with other captive birds until February 15, when it was liberated. During its stay at the banding station it subsisted largely on corn and gained $\frac{1}{2}$ pound during the period of a little more than two months. The bird at first seemed to suffer from cold and would stay inside its sheltered pen during extreme cold weather.

Rumors indicate that a Blue Goose was seen on Marthas Vineyard during the past gunning season, but this record has not been confirmed.

NEW YORK.

From Long Island, State Game Protector Everett R. Overton wrote that William Halsey killed a Blue Goose on Shinecock Bay on November 1, 1934. Two weeks later, November 15, four more were observed on the same bay by a number of persons. Mr. Overton stated that four years ago (November 1930) he observed four Blue Geese on Mecox Bay. It is also reported from several experienced gunners, but without further confirmation, that Dorcy Carter, Everett Talmage, and Samuel Lane each killed a Blue Goose in Shinnecock Bay early in November 1934. An unknown gunner was said to have taken one on Mecox Bay early in December.

Joseph J. Hickey, of the Linnaean Society of New York, wrote under date of February 12 that two flocks of Blue Geese were seen near Moriches Bay, Long Island, on November 8 and 9. The largest of these contained nine birds. Mr. Hickey further stated that sportsmen reported two immature Geese on Shinnecock Bay on November 25, but from the description these might have been either Snow or Blue Geese.

The East Moriches records of November 8 and 9, 1934, are further confirmed by LeRoy and Carlos Wilcox, of Speonk, Long Island. The former reports that on November 1, 1932, a young Blue Goose alighted in a pen with some Canada Geese at East Moriches. The bird was caught and a wing clipped. It was found to be in very poor condition, as were a couple of Canada Geese that came in with it. By January 5 the bird began to molt the feathers of the head and neck, and by the first of April it had attained complete adult plumage. In the meantime the primaries had again grown out, and one day early in May, according to Mr. Wilcox, the bird flew away and was never seen again.

Roy Latham of Orient, Long Island, wrote that he observed a Blue Goose on November 19, 1934, on Little Bay, a small body of water just inside the beach from Gardiners Bay, near Orient. The bird was foraging over the flats most of the day and was not seen after that date.

Mr. Latham assures me further that competent observers noted a specimen on Hooked Pond, East Hampton, on November 10. This bird alighted among a flock of Muscovy Ducks on the pond and fed with them. A local gunner later shot the bird and had it mounted.

A much greater concentration of Blue and Snow Geese is reported in a letter addressed to the writer on March 5 by James Savage, a well-known ornithologist of Buffalo, N. Y. His letter is so graphic that most of it is copied herewith:

"On October 29th, 1934, I was hunting Ring-necked Pheasants with three friends about 10 miles north of Batavia, N. Y. I was looking for a place to cross a drainage ditch to enter a cover of second growth when I heard a call that was new to me and I asked B. Hurd, already in the cover,

to locate the bird. In a couple of minutes another friend, P. V. Bowen, came along and said, 'Jim, there are some of your friends overhead.' Looking up I saw 5 Blue Geese and 1 Snow Goose (probably Lesser) flying about two gun shots away. Which species was calling I could not determine.

"On the same day, October 29, 1934, a flock of several hundred Blue Geese flew over the Transit Road, about 10 miles east of Buffalo and 1 Blue Goose was shot and is now in the Buffalo Museum of Science.

"On October 28th or 29th, 22 Snow Geese and 3 Blue Geese appeared at Schmitt's Muskrat Farm near Alabama, N. Y. The Snow Geese did not remain long but the 3 Blue Geese were there several days and were seen by Harold D. Mitchell, Harlan Eckler, and other members of the Buffalo Ornithological Society.

"Mr. Harold D. Mitchell received a post card from Mr. W. M. Guynes, of Erie, Pa., saying that on October 31st, 1934 he (Guynes) saw in the bay at Presque Isle, 454 Blue Geese, 80 Snow Geese, 28 Whistling Swans and 2 Canada Geese.

"On November 1, 1934, Mr. H. P. O'Shea, manager of the Bank of Montreal at Fort Erie, shot a Snow Goose on Niagara River (Canadian side) about 3 miles north of Fort Erie. This bird was not preserved. It had been previously wounded.

"We have recorded seeing a few Blue Geese before—one or two at a time—but never to my knowledge has there been such a flight of them here as occurred last fall. But the Snow Goose is still more unusual as I never saw it here before in the 50 years I have been observing birds.

"There is also a report that 2 flocks of Snow Geese were seen on some ponds not far from Lyndonville in Orleans County, N. Y., during the week of October 29th."

NEW JERSEY.

Both fall and spring occurrences of the Blue Goose in New Jersey are given. Dr. Witmer Stone (*The Auk*, Vol. 52, pp. 182-183, April 1935) writes that about the end of October an immature bird appeared on a pond at Cold Spring, Cape May County, and joined a flock of Pekin Ducks on a farm. The Goose became tamer as time passed, coming up to the farmer's barn with the Ducks, and was caught in a crab-net and placed in a chicken coop. Later the bird was released.

On November 11 two adult Blue Geese and a Snow Goose were observed by Charles A. Urner and Gerbert Rebell [*ibid.* page 182] standing on the open salt marsh at Tuckerton, Ocean County. Local sportsmen observed these birds on various other occasions several days during that week. Snow Geese commonly occur near the mouth of Delaware Bay in the spring of the year during the northward migration, but are uncommon in this area during the fall.

U. S. Game Management Agent Albert Stadlmeir has furnished convincing evidence that with some 10,000 Snow Geese twenty-five Blue Geese were feeding and resting on Egg Island, Cumberland County during the

last few days of March and the first week of April. He further states that a sportsman of Fortesque killed six Blue Geese during the past gunning season.

DELAWARE.

It is probable that the absence of Blue Goose records in Delaware during the past season represents an absence of competent observers at the appropriate time and places rather than an absence of Blue Geese in the area. U. S. Game Management Agent Albert Stadlmeir gives an unpublished record of a Blue Goose that was wing-clipped by a local gunner, Sam Crowley, on the Indian River late in the fall of 1930. The bird was taken to his home and placed with decoy Canada Geese and kept until its death in the summer of 1934. Several reports were received of a comparatively small number of Snow Geese observed feeding on the salt marsh meadows near Rehoboth Bay and Indian River in November of 1934.

PENNSYLVANIA.

An authentic Pennsylvania record of a Blue Goose is furnished by Dr. F. F. Fish, of Lancaster, who collected and photographed an adult Canada, a Snow, and two Blue Geese on November 8, 1934, on the Susquehanna River in Lancaster County.

MARYLAND.

Several records are available for the Maryland 1934 season. State Game Warden Walter McNamara, of Dorchester County, informed the writer that on November 2 an immature bird appeared on the Little Choptank River. The following day the bird came ashore with a flock of domestic Ducks owned by the warden's sister, but would fly out into the river when anyone approached. The bird was apparently tired and weakened from its long migration, however, for it refused to leave the vicinity and would return to shore to feed with the Ducks when conditions seemed safe. At night the bird went up a little stream 8 or 10 feet wide, to roost with the Ducks; so with the aid of a flashlight and crab net the warden captured the bird. Mr. McNamara still has the Goose which will later be placed at the State Game Farm.

On January 6, Mr. McNamara wrote that for several weeks prior to that date, two Blue Geese had been wintering around a hunting-club goose pen in Dorchester County.

Federal Game Management Agent Orin D. Steele, of the Eastern Shore, reported a Blue Goose killed with a flock of Canada Geese on the Carpenter Farm near Sassafras River, in Kent County. The bird was killed in a stubble grainfield baited heavily with corn. The Blue Goose undoubtedly was attracted by the large flock of Canada Geese that yearly frequent this

farm. Mr. Steele furnished the record of another bird killed at Pope Island, Worcester County. These were taken in the latter part of November and early in December.

Another fine adult specimen, according to three Maryland citizens (James S. Dixon, who mounted it, Robinson C. Walters, and Mr. Steele), was said to have been taken on Bishops Head, Dorchester County, during the first week of December, by Roy Slocum. The specimen, said to be an adult male, is in the Phillip Collection, Cambridge, Md.

A local gunner at Havre de Grace reported seeing four Blue Geese in one flock, during most of one day, on the Susquehanna Flats about the middle of December. None of these were collected and the record could not be confirmed with absolute assurance, although several experienced gunners were reported to have observed the birds.

A farmer living on the Sassafra River informed the writer that two immature birds came to his decoys in the winter of 1932. These were captured and one of the birds is still on his farm, the other one having recently been accidentally killed.

DISTRICT OF COLUMBIA AND VIRGINIA.

One of the most interesting Blue Goose records is that of a single immature bird that, late in October, joined a little flock of 11 introduced, wing-clipped specimens shipped to Washington, D. C., from E. A. McIlhenny's preserve in Louisiana and placed at Roaches Run, Potomac River, on the Mount Vernon Memorial Highway. This bird is at liberty to go and come at will and frequently flies about; but apparently has chosen to be a permanent semi-domesticated pensioner of the National Park Service and to remain an admired specimen in the shadow of our National Capitol.

During the past season a number of Blue Geese chose to winter on the coastal marshes of Virginia and North Carolina. It should be stated, also, that certain coastal islands are important wintering areas for fairly large concentrations of Snow Geese.

A visit was made by the writer on December 31, 1934, to Paramore Island, a longitudinal strip of barrier reef about 10 miles long, situated 5 miles east of the town of Wachapreague. At either end of the island was a large flock of Snow Geese, totaling 8,000 to 10,000 birds. The Geese were merely loafing or "bedding" on the sandy beach and were in compact flocks. The northern flock, numbering possibly 6,000, were in a solid pack, covering an area perhaps 150 to 200 yards by about 40 yards; while those at the southern point of the island were more scattered and more wary of approach. With each flock of Snow Geese were four adults and possibly one or two immature Blue Geese, which held together as a unit within the much larger assemblage. The northern flock was approached five times at

points along the shore and made to fly. Finally the birds rafted at sea about a quarter of a mile offshore. As long as the birds were observed the Blue Geese held together as a compact unit. Three separate groups or divisions of 100 Snow Geese were arbitrarily counted out. In these were 16, 19, and 15, respectively, immature birds, or an average of $16\frac{2}{3}$ percent immature. The flock scattered somewhat and a unit of perhaps a hundred birds, including the Blue Geese, was observed flying at sea parallel with the traveling car, which was moving at the rate of about 25 miles an hour. The birds were at first in front of the car and when pressed to what appeared to be their maximum speed they were flying at 35 miles an hour. During this time, however, the birds were rising rapidly in elevation. These rates were in marked contrast to those of a passing flock of Sanderlings and Red-backed Sandpipers which cruised at a rate varying from 40 to 45 miles an hour.

The caretaker of the Paramore Island Gun Club informed me that these Snow Geese have been arriving en masse at the island between the first and 10th of November, and would depart the last of February or the first of March. He believed that the migrating birds arrived and left late in the afternoon or night, but have been frequenting this particular island for only the past ten years.

C. O. Handley, of the State Game Commission of Virginia, reports that a few Snow Geese made their appearance in the vicinity of Richmond last fall and that one bird spent the winter with a large flock of Canada Geese at Curles Neck Farm, in Henrico County.

C. H. Harris, of Dogne, reported that on November 8 he killed four Blue Geese in baited waters on his premises in King Georges County. Specimens were not saved and therefore the record cannot be verified.

NORTH CAROLINA.

Coastal North Carolina records of Blue Geese for the past year are numerous. W. E. Crouch and James Silver of the Bureau of Biological Survey, in company with Superintendent Joe Mann of Lake Mattamuskeet Wildlife Refuge, observed five Blue Geese (4 adult and 1 immature) in one flock and two others with a flock of Canada Geese on Mattamuskeet Lake on November 8, 1934. Deputy Game Management Agent E. R. Greene, of the same Bureau, reported seeing one Blue Goose on October 30, in company with a flock of Swans. On November 20 he saw a small flock of seven adults. On January 9, a single bird was seen with Swans; while on March 13 two unaccompanied birds were reported. On this same refuge (Mattamuskeet Lake), Mr. Greene reported one Snow Goose on November 27 and four on December 4.

Superintendent Mann reported seeing one Blue Goose on the refuge on November 17 and stated that gunners killed a bird of this species on the

public shooting grounds some time in November. Federal Game Management Agent William Birsch states that another of these birds was killed at this same place in December of 1933.

State Game Commissioner J. D. Chalk wrote that a number of competent observers reported seeing a small flock of Blue Geese on Currituck Sound early in the gunning season. Specific details, however, were not given.

On January 15, 1935, in company with Federal Game Management Agent William Birsch, the writer observed a flock of approximately 2,000 Snow Geese on Pea Island on the eastern border of Pamlico Sound. With these were six adult and an undetermined number of immature Blue Geese. This island, annually visited by Snow Geese, is the normal southern limit of the Snow Goose range on the Atlantic seaboard.

SOUTH CAROLINA.

According to a letter from Alexander Sprunt, the Blue Goose made its appearance in South Carolina on November 3, when a flock of seven birds was seen at the Clay Hall Plantation, Combahee River. Several reports mention a small flock of birds in this general area, but it is probable that all refer to the same group. On November 10, Mr. Sprunt states that five birds were seen on the Cherokee Plantation, Combahee River, and that these remained for 10 days in the rice fields of this plantation. On November 13, three adults and three juveniles were seen at this place by W. L. McAtee and H. L. Stoddard. It is entirely possible that these birds are the same as those reported on November 3 at the Clay Hall Plantation, as the two places are less than 10 miles apart.

GEORGIA.

The only Georgia record of a Blue Goose collected is that of an immature specimen taken about 1 mile east of Savannah by Ivan R. Tomkins, of the U. S. Dredge *Morgan*. On November 4 he observed another bird in flight at the same locality [The Auk, Vol. 52, p. 78, January 1935]. A previous sight record of three birds made in 1930 constitutes the only earlier published record for this State [The Auk, Vol. 47, p. 577, October 1930].

CAUSE OF COASTAL MIGRATION.

The causes of this unprecedented coastal migration cannot be definitely determined, and it is not improbable that a combination of factors may be responsible. The more probable explanations may be one or more of the following:

(1) Strong north and northwest winds and storms during the birds' migration before they reached the United States, which blew them off their accustomed course.

- (2) Increase in population forcing dispersion.
- (3) Disturbance on the wintering ground resulting in continued migration or wandering.
- (4) Drought along the migratory lane.

Of these factors, the first seems to be the most likely. A report from the Weather Bureau indicates that an unusually severe storm with strong north and northwest winds blew for several days over Central and Eastern Canada and Hudson Bay region between October 25 and November 15, and probably at the very time the birds were in migration over this area. By the first of November this storm had reached the New York City area with an almost record gale of 61 miles an hour.

It is probable that there has been a slight increase in the Blue Goose population during the past two years, causing over-crowding in the established and accustomed wintering grounds. Naturally this would tend to cause the birds to spread out somewhat. Furthermore, drilling for oil, trapping, and reclamation work in many of their principal wintering grounds have been most disturbing during the past few years. Even though this is true, there has apparently been no great migration or abnormal increase in numbers in inland areas adjacent to the Gulf Coast of Louisiana and Texas.

During the northward migration up the Mississippi Valley these birds appeared to be much more common than in the southern flight. Drought conditions, or the drying up of accustomed stopping points in migration, would obviously cause a shifting and compel the birds to go elsewhere. This has occurred, but the birds have not been known to make any great deviation from their accustomed route. Hence, this could in no way explain such a marked deviation during the southward migration.

The numbers and movements of the birds on the Atlantic coast seem actually to have been a migration and a movement of the birds from the north to the south along the coast. Therefore, it seems improbable that the Atlantic-coast birds saw the Louisiana area this year.

FOOD HABITS.

On Paramore Island, in Virginia, and Pea Island, in North Carolina, a number of feeding places were observed where Geese, largely Snow Geese, had been feeding, and all the grasses and sedges in those particular areas were eaten off, mashed flat beneath the surface of the shallow water, or dug up. Feeding seems to be done principally during the early hours of the morning, late in the afternoon, and possibly at night. The birds appeared to feed largely upon the roots of the plants, but subsisted to a lesser extent also upon the exposed green portions. Each Goose apparently excavated a round hole in the mud to a depth necessary to obtain all the roots and rhizomes of a clump. The holes seemed to have been reworked and were so close that they almost touched.

In the areas along the coast where feeding observations were made, marsh grass (*Spartina patens* and *S. alterniflora*), with lesser quantities of salt-grass (*Distichlis spicata*), and rushes (*Scirpus robustus* and *S. species*) were being consumed. Some segments of the alkali-weed (*Salicornia* sp.) also were being taken. Snow Geese are known to feed extensively on this plant in some other parts of the country. In the Bear River Marshes, in Utah, it is one of their most important foods. In a feeding experiment, it was found that while they would take corn or wheat, they seemed to prefer the alkali bush and an assortment of grasses and sedges. On the Texas coast at Laguna Lago, Kleberg County, F. M. Uhler found that they were partial to the green stems, leaves, and seeds of buffalo grass (*Bulbils dactyloides*). After being browsed by the birds the grass had the appearance of having been heavily pastured by cattle. In grain and stubble field severe damage is sometimes inflicted. In the far north the birds are said to feed to some extent on crowberry (*Empetrum nigrum*) and horse-tail (*Equisetum* sp.), as well as on arctic grasses and sedges.

The stomach material available for examination is too meager to allow precise deductions regarding the food of Blue and Snow Geese in the coastal salt-marsh plains. A larger and more representative series would doubtless lessen the apparent percentages now indicated for wild rice, and increase those for other grasses and sedges. The following tables based on stomachs examined in the Biological Survey laboratory will show the present state of our knowledge on the subject:

TABLE 1.—*Analysis of the Contents of Stomachs of 19 Snow Geese (Greater and Lesser) taken in widely separated parts of the United States, mostly in November and December.*

Constituents	Percent	Constituents	Percent
Gravel (not food)	42.74	<i>Zizania aquatica</i>	25.00
Vegetable food	100.00	Grasses (unidentified)	28.44
Animal food	—	<i>Scirpus americanus</i>	18.75
<i>Equisetum</i> sp.	22.23	Leguminosae	2.81
<i>Oryza sativa</i>	2.77		

TABLE 2.—*Analysis of the Contents of Stomachs of 28 Blue Geese taken in Louisiana during the winter months (greater variety of items than in Table 1).*

Constituents	Percent	Constituents	Percent
Gravel (not food)	30.05	<i>Sparganium eurycarpum</i>	0.25
Vegetable food	100.00	Cyperaceae (unident.)	22.19
Animal food	(trace)	<i>Oryza sativa</i>02
<i>Carex</i> sp.	2.79	<i>Triglochin maritima</i>	9.21
<i>Scirpus</i> sp.	3.75	<i>Spartina glabra</i>	3.92
<i>S. americanus</i>	16.75	<i>Typha</i> sp.	20.25
<i>S. robustus</i>	10.36	Plant fiber (unident.)	1.70
<i>Eleocharis</i> sp.	3.17		
<i>E. palustris</i>	5.64		

U. S. Biological Survey, Washington, D. C.