Division of Wildlife Refuges

Narrative Report Routing Slip

Refuge BLACKWATER Year 1964

Chief's Office: Mr. ~~Gillett~~ ______ ~~Mr. Ackerknecht~~ ______

~~Mr. Fernanich~~ ______ ~~Miss. Rau~~ ______

Wildlife: Mr. Ballou ______ Mr. Webster ______ Mr. Stiles ______

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Blackwater National Wildlife Refuge

Narrative Report

1964

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Personnel

Cornelius W. Wallace.....Refuge Manager
Ervin W. McIntosh.....Refuge Manager
Daniel Dudak.....Refuge Manager
Guy W. Willey.....Wildlife Technician
G.Wallace Stewart.....Maintenanceman
Owens P. Hughes.....Maintenanceman
William G. Richardson.....Maintenanceman

U.S. Department of the Interior

Fish and Wildlife Service

Bureau of Sport Fisheries and Wildlife

Blackwater National Wildlife Refuge
R.F.D. #2 Cambridge, Maryland

Established January 23, 1933
Total Acreage - 11,216

Blackwater National Wildlife Refuge

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I. General

A. Weather Conditions.

January. Winter persisted throughout the month with an extreme low temperature of 7 degrees being recorded on the 14th. A total of 5.15 inches of precipitation was recorded. Ponds and rivers were frozen during the middle of the month when below freezing temperatures prevailed. Ice thickness ranged from 1 to 2 inches during this period. During mid January snowfall accumulation amounted to 5.5". Moisture content within the soil remained high adding to the difficulty in mobile traveling throughout the refuge. Pond areas steadily increased in water depth although strong winds persisted spasmodically throughout the period.

February. February continued to be seasonably cold along with the precipitation remaining high. Precipitation for the month totaled 4.66 inches. Temperatures did not drop as low as they had the previous month. A low of 20 degrees was recorded as opposed to a low of 7 degrees which occurred during January. Snowfall the majority of which fell during the later part of the month amounted to 6 $\frac{1}{2}$ inches. Due to the high amount of precipitation, stop logs were removed from the headquarters Pond No. 2 since drainage was imperative to prevent flooding of refuge fields. Also late in the month, stop logs were removed in the Dieffenbach Pool Dike to prevent flooding of the Old Mill Road and facilitate draining of the area for spring and summer planting of refuge crops.

March. The advent of spring occurred during March with a maximum temperature of 76 degrees early in the month. The low of the month was not sufficient to bring about any appreciable amount of icing. Precipitation appeared to be equally distributed throughout the month, totalling 3.76 inches. Draining of the Dieffenbach Pool Unit continued for spring and summer plantings. High winds during the early part of the month eatimated at 50 MPH did no damage to the refuge. Traces of snow fell throughout the month and remained on the ground for only short periods of time.

April. The April showers played an decisive role in the amount of spring farming completed during the month. During the earlier part of the month soil moisture conditions were such that plowing was feasable. Rainfall during the latter part ofthe month, brought farm plowing to a standstill. April being a typically rainy month, had a total rainfall of 4.39 inches. Temperatures continued to climb throughout the month with a maximum high of 85 degrees and a low of 28 degrees being recorded.

May. Fair weather conditions prevailing throughout the month helped in keeping soil moisture in a tillable condition. In addition, soil remained dry enough to plant the corn crop. Precipitation was appreciable low with a total of 0.35 inches recorded for the month. Temperatures similar to the preceeding months, tended to steadily increase with a maximum high of 90 degrees recorded.

June. The 1st week of June arrived with rainfall which promoted rapid growth in the newly seeded fields. The total rainfall for the month was 4.27 inches. Drought conditions prevailed during mid-June. These conditions were broken with a 2.11 inches of precipitation recorded during a thunderstorm on the 24th. During the month the Dieffenbach Pool bottom was completely drained and plowed for the planting of Millet in July.

July. Unusual heavy precipitation occurred during the month. So much so, that the Dieffenbach Pool had to be redrained due to the heavy rainfall flooding the entire area. The most appreciable rainfall occurred on the 23rd total accumulation was 4.02 inches. Temperatures remained in the upper 70's and low 80's throughout the month. A high of 91 degrees was recorded on the 28th. and a low of 54 degrees on the 7th. Total rainfall amounted to 9.17 inches for the month.

August. Drought conditions prevailed throughout August and remained at the end of the period. The late crops of Millet, Buckwheat, and ryegrass nedded rainfall badly. Water levels in the fresh water ponds dropped during the month since total rainfall was only 0.73 inches compared to a normal of 4.75 inches. A high of 94 degrees was recorded on the 23rd and a low of 50 degrees on the 15th.

September. Drought conditions of August was broken on the 1st day of the month with 0.82 inches of rainfall recorded and several well distributed rains throughout the month deposited above normal precipitation with 5.26 inches recorded. Heaviest one day amount was over 2.00 inches on the final day of the month. Temperatures remained on the mild side with a high of 91 degrees and a low of 47 late in the month. Pond levels rose in the fresh water impoundments and waterfowl begin to arrive near the end of the month.

October. Precipitation continued in early October but tapered off by mid month. Total rainfall was only 2.91 inches and ideal harvest conditions were present during the last of the month. Temperatures remained very mild with the upper 60's and low 70's throughout the month. A high of 76 degrees was recorded on the 18th. and a low of 29 degrees on the 24th.

November. Spring like weather conditions prevailed until near the end of the month. Winter type weather arrived on the 24th. with a drop in temperatures of 28 degrees down to a low of 20 degrees. This caused some icing of ponds for a few days, however, this was short lived since a warming trend set in and mild weather continued into December. November was a dry month with only 2.72 inches of Rainfall and a trace of snowfall. High temperature for the month was 73 degrees on the 13th.

December. Unlike last December, when heavy snowfall was recorded, this year rainfall was the form of precipitation and fell on 10 days of the month totalling 3.92 inches. Daytime highs ranged well above freezing and cool nights caused no major ice problem except for a few days during mid month when the low for the month 18 degrees was recorded. This was one of the mildest Decembers on record for the refuge. A high of 65 degrees was recorded on the 24th and ten days had daytime temperatures of more than 60 degrees.

	Snowfall	Precipitation This Month	Normal	Max. Temp.	Min. Temp.
January	5.5	5.15	3.47	63	7
February	6.0	4.66	4.12	61	20
March	3.0	3.18	3.82	76	28
April	1.0	4.39	3.82	85	28
May		0.35	5.61	90	46
June		4.27	3.45	97	50
July		9.17	2.00	91	54
August		0.73	4.75	94	50
September		5.26	4.03	91	46
October		2.91	5.13	78	29
November	T	2.72	5.33	73	20
December	T	3.92	3.43	65	18
Totals	15.5	46.71	48.96	97	7

B. Habitat Conditions.

1. Water. Precipitation for the early part of 1964 was about normal with ice conditions present due to the low temperatures of January and February. The water levels remained normal throughout the early spring until drought conditions of May and early June forced the gauge readings down. However, this was unlike 1963 when the pond levels were significantly low due to severe drought conditions. A local cloud burst on July 23 dropped 4.02 inches of rain in a short period. This deluge of rain supplied the fresh water impoundments with water for the remainer of the year. October and November were very dry and mild. December exhibited above normal precipitation and temperatures. The rivers and ponds remained freee of ice throughout much of the migration period of late 1964.

Pond and river tides remained normal, except through March 20 to the 23 when heavy northwest winds dropped the tides abnormally. Notheast winds and rainstorms forced the tides above normal but these conditions lasted

only a few days. The northeast storm of November 20 and 21 , forced high tides to prevail in the marshes and brought a large concentration of waterfowl into the refuge area to seek shelter. There were no damaging hurricanes to report during 1964. Ice conditions prevailed during the month of January and February on most of the rivers and ponds. Snowfall for the year amounted to 15.5 inches for the year.

2. Food and Cover. Waterfowl found it increasingly difficult to obtain food from the refuge fields which had been picked clean due to heavy concentrations in preceding months. Ice conditions in both January and February prevented continued use of the burned marsh areas which normally provided additional food. Baiting trapping and banding sites provided some food but many of the waterfowl were forced to leave the area in search of natural food. Prior to the spring migration burned marsh areas provided new sprout growth for browsing waterfowl. Spring and summer plantings provided excellent amounts of food with 97 acres of corn, 114 acres of buckwheat, 119 acres of millet, 5 acres of sorghum, 113 acres of ladino clover, 248 acres of ryegrass, and 57 acres of wheat which was available for waterfowl during the fall migration period. By the end of November, most of the mentioned crops had been consumed, except the refuge standing corn which was 90% consumed by the end of December.

II. Wildlife

A. Migratory Birds. The production of waterfowl during 1964 was only slightly higher than that of 1963. Mallard production was 175 birds over the previous year with the black duck and blue-winged teal remaining about the same. No nesting of Canada goose has been observed on the refuge since 1962 when only two broods were observed.

The population of Canada geese ranged from approximately 275 during the summer months to approximately 75,000 during the peak concentration which came the last two weeks of October. It dwindled to approximately 30,000 geese during November only to reach the peak again early in December. The peak concentration of geese was approximately 39,000 below that of 1963.

A peak of 182 Snow geese were reported during the month of December which tripled the peak concentration during the same period of 1963. Six snow geese were observed using the refuge the first 2 weeks of June.

The Blue goose population reached a population of 86 and remained in the area throughout December.

Duck population reached its peak in middle of October with 111,900 birds. The average population was approximately 60,000 ducks during September, October, November and December.

The total waterfowl use-days on the refuge was approximately 14,667,535 during the 12 month period ending on August 31, 1964 which was approximately 2,500,000 less than the same period in 1963. The duck population use-

days decreased approximately 3,000,000 while the goose use-days increased by 500,000. Swan and Coot use-days decreased slightly.

The Morning Dove population reached a peak of 800 birds during August and September and was evenly distributed over the entire refuge. They tended to feed mostly in the standing grain fields of buckwheat, corn and soybeans. Sufficient food and cover has been available throughout the year. Hunting success was reported fair adjacent to the refuge.

B. Upland Game Birds.

Excellent production during the year resulted in a high population of Bob-White Quail (Colinus virginianus virginianus). No drowning rainfalls or predation was noted. The population is estimated at 1,000, a record number for the refuge. The population may have reached the saturation point for the habitat available. The largest number could be observed in the Dieffenbach Pool Unit and wooded areas of Kentuck Swamp. Main nesting areas have been the dike road edges and the small islands of the refuge. Good cover has been available and refuge grain fields provided sufficient food throughout the year.

C. Big Game Animals.

The White-Tailed deer (Odocolius virginianus) showed a slight increase in spite of heavy hunting and kill adjacent to the refuge during the nine day deer season in the County. A total of 1,982 deer were taken. The State permitted the killing of two deer of any sex per person per season. Hunting pressure was extremely heavy adjacent to the refuge. The hunting adjacent to Blackwater is beneficial in that the population is thereby held in check and crop depredation is significantly reduced. Large numbers of deer used the refuge cropland throughout the year. In general, deer appear to be in good physical condition, perhaps due to excellent food and habitat available on the refuge. Numerous deer trails throughout the highways and marsh areas indicate frequent use. Population was estimated at 150 at the end of the period through observable activity while performing daily duties.

D. Fur Animals, Predators, Rodents and Other Mammals.

1. Muskrat. The annual survey of muskrat populations revealed an estimated 7,300 muskrats on the entire refuge which was relatively low for the habitat and marsh acreage. However, trapping was permitted on the areas bordering the dikes and roads to prevent possible damage. The trapping resulted in the removal of 1,458 from the nine trapping units recommended and approved for trapping. A tabulation listed under the Fur Harvest Section of this report shows number removed from each units trapped. The muskrat survey conducted in November 1964 for the 1965 season showed an estimated population of 6,800 on the refuge. Again the areas adjacent to the dikes and roads show substantial populations. Approval has been granted to trap the nine areas in the forthcoming trapping season beginning January 1, 1965. The muskrat picture appears to be the same as last year. It is beleived that

the dikes and road banks protect the muskrat from predators, storms and other adverse conditions, whereas the open marshes are more susceptible to these conditions. The food supply (excellent Three-Square) and other habitat far surpasses the existing population.

2. Raccoon. Raccoon (Procyon lotor) remains dense with an estimated 550 present on the refuge. The majority of the animals are concentrated in the woodland areas of Kentuck Swamp, Kuehnle Tract and near headquarters. We have been fortunate that this animal has not posed any threat to banding operations. However, this animal is a threat to nesting activities and several duck nest were destroyed by the raccoom in the McGraws Island Area during the nesting period of May.

3. Fox. There appears to be an increase in the red fox (Vulpes fulva) population. An increase was noted in November and December through visual observations of signs left in the snow and the fox themselves. The Dieffenbach Pool and Kuehnle Tract Area appear to be natural niches for the red fox. We feel the refuge increase is directly related to the heavy concentrations of waterfowl. Most of the estimated population of 60 prefer to remain on the marsh islands or woodland areas isolated from humans.

4. Squirrel. The squirrel (Sciurus carolinensis) population which was reported as showing a decrease in 1963 continues to decline. Byrant Fox was estimated at 150 and Grey squirrel (Sciurus carolinensis) at 250 or a decrease of 50 Bryant Fox and 100 Grey squirrels over the same period last year. This has been a county wide decline and many persons attribute it to the drought conditions of the past few years. Hunting adjacent to the refuge was reported as only fair. The acorn crop in the forest was adequate to the needs of this animal.

5. Cotton-Tailed Rabbit. Rabbit (Sylvelagus muttallis) populations on the refuge compared with previous years appeared to remain static until November and December. It then appeared a slight decrease was evident. It is beleived that the noticeable increase in the fox population as reported early in this report had a bearing on the decrease in the number of rabbits observed, especially along the dike edges and Old Mill Road. From visual observations during December the estimated 500 reported in the January thru April period was down somewhat. There appeared to have been sufficient food and cover to support the standing population.

6. Skunk. The Eastern Skunk (Mephitis nigra) population continues to remain relatively low compared to several years ago. The population is estimated at 70 compared to 150 in 1960. Only a few skunks were observed during the year and we are glad to report none have been reported adjacent to refuge headquarters.

7. Miscellaneous Fur Bearers.

1. Opossum. The Opossum (Didelphis virginiana) population remains about static. We estimate the population at 170 for the entire refuge area.

2. Otter. The Otter (Lutra canadensis) is evident of having a good population. An estimated 40 use the refuge area. The food supply is available in the deeper waters of the Big Blackwater around Harpers and Keens Ditch with the heaviest amount of activity being observed there. One Otter was reported swimming in the river adjacent to the refuge boathouse during the annual waterfowl hunting season. The Otter home range on the refuge is very extensive sometimes crossing large areas in quest of food. The borrow pits throughout the refuge are some of his favorite haunts.

3. Nutria. Nutria (Myopotamus coypu) remained relatively low on the refuge although it is higher than in 1963. The estimated population is 50 and appears to be concentrated on three trapping units on the South side of the refuge. No activity was observed on the area adjacent to the headquarters and Dieffenbach Pool units during the November survey, however, late in December one was eradicated on the Dieffenbach Pool barrow pit showing the survey may have overlooked a few. No management problem is prevelent at this time but eradication efforts will be made and refuge personnel will continue to trap and remove as many as possible. We will encourage adjacent marsh owners with Nutria populations to remove them in an effort to stop any increase in population on the refuge caused from these animals migrating from adjacent marshes.

E. Hawks, Eagles, Owls, Crows .

1. Hawks. Hawk population remained high throughout 1964. Sparrow (Falco sparverius), Marsh (Circus cyaneus hudsonius), Cooper's (Accipiter cooperii), Red Tailed (Buted jamaicensis), Red Shouldered (Buted lineatus), Sharp shinned (Accipiter striatus velox), Broad Winged (Buted platypterus platypterus), Rough Legged (Buted lagopus s.johannis), Duck (Falco peregrinus anatum), and Pigeon Hawk (Falco columbarius columbarius)were all present during the year. The Marsh hawks were common during the early part of January and February and later in the year as cooler weather arrived. Sparrow hawks were numerous during their fall migration period. The Red-tailed hawk is a permanent resident and can be found throughout the year. Ospreys are a common sight during the summer with many nesting on the refuge. A bird watcher's dream comes true upon visiting Blackwater and observes the many hawks skimming low over the marsh or circling efforthessly overhead in search of prey.

2. Owls. The two most common owls are the Barn (Tyto alba pratincola) and Great Horned (Bubo virginianus). Barn owls continue to nest on the refuge. They prefer the two observation towers and boathouse at Qtrs #1. Atotal of five broods of owlets were hatched on the refuge in the three locations mentioned above. Total production was 14 young.

3. Bald Eagle. Bald Eagle (Haliaetus leucocephalus)reached a peak of 20 during January and declined in numbers during the summer months to 7. With the December increase in waterfowl this Buteo showed a population increased and were estimated at 15. An Eagle nest was located on Barbadoes Island in late February but close ground and aerial observations showed no evidence of young produced. Refuge personnel observed the savage antics of a Bald Eagle catching a mallard duck in mid air near Headquarters Pond. Eagles could commonly be observed scanning the marsh in search of crippled ducks, geese or other prey which became accessable.

4. Golden Eagle. One Golden Eagle (Aquila chrysaetos canadensis) observed on December 28 during the Annual Christmas Bird Count conducted by Mr. Chandler Robbins and his group. On two different occassions eagles sighted in the same area as late as March 19, 1964, and observed in the December 1963 Christmas Bird Count. Speculation as to wheather or not one of the birds sighted was a bird trapped and banded by the Late Steele Webster and a present member of the staff, Wildlife Technician Willey in 1957. This bird was later recaptured in New York State by another bander.

5. Crows. Largest numbers of Southern Crow (Corvus corax) using the refuge in December could be found in the many marsh areas and wooded areas of the refuge. The population was estimated at 1,000. Roosting sites on the refuge proper are unknown. During the waterfowl nesting period crows do an effective job of destroying any nest they are able to locate.

F. Other Birds. The Barnacle Goose (Branta leucopsis) was believed to have been observed by a Mr. Hake from York, Pennsylvania during November. However, effects to verify the finding by Audubon personnel in the large flocks of Canada geese during the period was unfruitful. Maintenanceman G.Wallace Stewart was present during the goose sighting and agreed with Mr. Hake that it appeared to resemble the Barnacle goose.

G. Fish. Large numbers of carp, mud shad, catfish and a lesser number of striped bass, Large mouthed Bass, Perch, herring, shad and crappie could be found. White perch while had a die off significant proportions in the Bay and tributaries throughout the summer of 1963. The die off was attributed to a toxin producing organism uncommon to the infected area. The scarity of this fish in turn raised prices to record heights during 1964.

H. Reptile. We know of no really heavy concentrations of snapping turtles on the refuge. Efforts to encourage local fishermen to trap snappers has been met with little success due to the low price of the snapper meat and the high cost of equipment. Predators are doing well in keeping the population in check. No management problem is foreseen regarding this reptile. Blackwater is fortunate in that it has no other reptiles posing a major problem.

I. Disease. No apparent diseases of epidemic proportions have been observed.

III. Refuge Development and Maintenance

A. Physical Development.

The APW Program on the refuge came to an eand during the year with the completion of new roads, dikes, Office Building and Visitors Center at Blackwater. A new modern wonderful office building was completed in late March and was occupied shortly after.

The grading, sloping and seeding of the dikes were completed in June, but the other short spands of roads still need work before they can be used with confidence. Though the construction of the Visitor's Center has been completed, the displays have not yet been received from the Regional Office. It should be open to public viewing within a couple of weeks after the displays are received.

Other development includes the completion of the Boathouse/Office building at Martin Refuge during May. Grading was completed around the newly constructed building. Fill which had been obtained from the barrow pit area was spread and graded.

Landscaping was also completed around the newly constructed office building, visitors center, flagpoles and radio tower at Blackwater. Ascorted shrubry was also placed around the Visitors Center.

Maintenance

The end of the APW program left the refuge with several pieces of equipment in a poor condition due to the heavy use during the program which begin in 1962. Several motor vehicles were given major overhauls and placed in good condition. Five vehicles were disposed of by sale through GSA, since they were no longer needed.

Repairs have been performed on the following equipment during the year.

Case Tractor
Farmall M Tractor
Farmall MTA Tractor
Farmall 450 Tractor
Int. Dump Trucks (2)
Ford Dump Trucks (2)
Airboat Skimmer FWS-110
Bufflehead Boat FWS-16
LCM Barge
Pickup 1/2 Ton (2)
Cargo Carrier
Int. Tractor-Trailer Unit
D-7 Caterpillar
HD-7 Tractor
B.E. Crane
Plows (3)
Harrows (2)
Mowers (2)

Most of the above equipment is more than 10 years old and many of the floating equipment more than 20 years old and it is necessary to repair same since replacement cost would be high for much of the listed equipment.

Reposting of boundaries of Blackwater, Eastern Neck, Susquehanna and Martin Refuge was performed prior to the opening of the annual waterfowl hunting season.

Several more culverts were placed on refuge roads during the summer months. Maintenance was also performed on the Kuehnle Tract Road, Kentuck Swamp Road, Headquarters to Dieffenbach Pool road. Refuge personnel hauled fill and slag on these roads during the spring and summer.

In September the small area of road owned by Mr. Fred Ewing in Kentuck Swamp was cleared, ditched and construction accomplished after the road easement was secured by the Regional Office. Work on the Easement begin at the start of the first APW project.

The area in the rear of the Visitors Center was filled by hauling fill and top soil and then planted in ryegrass for a sod after applying the necessary soil amendments.

Approximately 5 miles of road edges were seeded in ryegrasss,Fescue and Lespedeza during the early spring by refuge personnel after grading and sloping had been completed.

Refuge lawns and grounds at Blackwater, Martin, Susquehanna and Eastern Neck were mowed at intervals until killing frost arrived late in October. The addition of the grounds at the Picnic Area, Visitors Center, New Office and large grounds at Eastern Neck placed a heavy work load on personnel during that period since refuge farming requires long hours to accomplish the job.

Painting of the Kitchen, dining room at Qtrs #1, Kitchen at Qtrs #4 and two bedrooms at Qtrs #2 covered the interior maintenance of residences during the year.

A new porch floor and repairs to remainer of Porch at Qtrs #3 was accomplished in 1964.

Maintenance was performed on all grass cutting equipment used on the four refuges.

B. Plantings.

1. Aquatics and Marsh Plants. None to report.

2. Trees and Shrubs. In July 40 assorted shrubs were planted in the area around the Visitors Center. Survival was 100% on the Holly, Huges, and Lugutrums, with no rodent or insect damage or adverse climatic factors to affect growth.

3. Upland Herbaceous Plants. None to report.

4. Cultivated Crops. Total refuge acreage under cultivation during 1964 was 823. Eight different crops were planted for waterfowl and other wildlife use. Farming of refuge lands begin early in the year with the seeding of ladino clover in February and March. Plowing of lands for planting of corn, sorghum and the cover crop of soybeans was begin in April. Planting of buckwheat, millet, ryegrass and wheat continued throughout the summer and early fall. Aerial seeding of ryegrass was performed in late August. Harvesting of approximately 35 acres of corn

adjacent to the road edges was completed in early November.

As mentioned in the section on weather of this report, growing conditions showed a mark improvement over growing conditions of 1963. Rainfall for the year was near normal although two short drought periods were experienced, namely the first of May and again in August. However due to the low heavy type soil on the refuge, crops produced above average and generally far better than the richer, light sandy well drained soils of the upper county. A record corn crop was grown on the refuge with yields averaging an estimated 100 bushels per acre. The application of Anhydrous Ammonia (100 lbs per Acre) and several timely rains along with control of the pest weeds accounted for the good yield. Yields of the other grain crops and growth of green browse and green manure crops were above average for the refuge lands. The following is a tabulation of refuge crops listing the Field Number and Acreage.

Name of Crop	Field No. or Name	Acreage
Buckwheat	B	15
"	D	23
"	Y	29
"	R	23
"	S	10
"	A-3	4
	Total	114
Corn	A	15
"	E	25
"	J	5
"	L	22
"	O	30
	Total	97
Ladino Clover	C	7
"	T	4
"	U	4
"	I	5
"	A-2	4
"	McGraws Island	12
"	Kuehnle Tract	37
"	P	19
"	Q	18
"	X	3
	Total	113
Millet	Z	61
"	M	36
"	N	22
	Total	119

Name of Crop	Field No. or Name		Acreage
Ryegrass	F		30
"	H		13
"	A-1		74
	Aerial over seeding		
	Corn Fields		97
	Buckwheat Fields		104
		Total	248
Sorghum	Dieffenbach Bottom		5
		Total	5
Soybeans*	Newly Cleared Land		60
"	Field K		10
		Total	70
Wheat	Newly Cleared Land		37
	Field K		10
		Total	47
Fallow	Field G		11
		Total	11
	Grand Total		823 .

* Soybeans plowed downed as green manure under Soil & Moisture program and planted in winter wheat.

Farming operations at the Eastern Neck Refuge were carried out by a local farmer under a Co-Operative Farming Agreement. Mr. Herman Hill, Rock Hall, Maryland the local farmer placed 288 acres under cultivation with 130 1/2 acres in corn and 157 1/2 acres in soybeans. Refuge share was 72 acres of corn which resulted in the yield of 5,674 bushels placed in refuge trucks after harvest. Corn will be used in the banding program by Blackwater, Chincoteague and Game Management Division in Maryland. Drought conditions in Kent County caused the yields of both crops to fall well below average. Corn average was near 80 bushels per acre and soybeans about 10 bushels per acre. All crops were harvested from the Eastern Neck Refuge under the farming agreement.

C. Collections and Receipts.

1. Seed or Other Propagules. 200 bushels of mixed grain was received from the U.S. Grain Appraisers, Baltimore, Md. during the year. 5,764 bushels of shelled corn was received from Eastern Neck Refuge as the refuge share under the Co-Operative farming agreement. 1,000 bushels of corn was transferred to Chincoteague Refuge and another 1,000 bushels available for the Game Management Division in connection with the banding program.

The following seed was purchased and planted in refuge fields during the year.

Buckwheat.....115 Bushels
Corn..... 20 "

Ladino Clover	2 Bushels
* Soybeans	250 "
Millet	150 "
Sorghum	1 "
Ryegrass	230 "

*Soybeans on hand from 1963 harvest on the refuge.

2. Specimens. None to report.

3. Control of Vegetation. Vegetation control at Blackwater during 1964 was the spraying of broad leaved weeds in the corn fields. Target pest were mainly, Pig Weed (Amaranthus retroflexus), Rag Weed (Ambrosia artemisaefolia), (Ambrosia trifida) and Morning Glory (Ipomoea lacunosa). Growth of the corn was from 4 to 6 inches and treatment dates were June 10 and 11th. 97 Acres of corn was sprayed with 2,4, Dichlorophenoxyacetic Acid with water as the carrier. Application rate was 1/2 pt. of 2,4, D and 8 gallons of water per acre by use of tractor mounted sprayer.

Cost Breakdown

Labor	$150.00
Materials	50.00
Equipment	50.00
Total	$250.00

It was estimated that 80% of the pest weeds were killed in the corn fields treated. Spraying increased the yields and cut the cost of growing the corn crop since it eliminated the need of one cultivation. No adverse effects were observed and conditions were good during the period of application.

The Co-Operative farmer at Eastern Neck Island Refuge carried out the approved spraying of 130 1/2 Acres of corn for control of broad leaved weeds, mostly Pig Weed, Rag and Morning Glory. Period of application was May 10 thru 15, with corn growth about 2 to 8 inches. Atrazine 80W at the rate of 2 lbs per acre with 20 gallons of water as the carrier sprayed with a tractor mounted sprayer.

Cost Breakdown

Labor	$100.00
Materials	600.00
Equipment	100.00
Total	$800.00

An estimated 90% kill was reported on the weeds in the corn fields treated. Spraying increased yields and cut the cost of growing the corn since at least one cultivation was saved. No adverse effects were observed in connection with the spraying of the Atrazine.

E. Planned Burning.

1. General. Approved control burning program was completed by late February. Refuge personnel with the aid of the local trapper burned marsh management units No. 3, 6, 7, 11, 13a, 13b, 15, 27, 28, 29, 32, 33, 34, 35 and 35A or a total of 2,329 acres. Although weather conditions prevented the use of the areas early in the year, by the end of February and throughout March large concentrations of geese could be observed using these areas. The geese prefer green shoots over other grains as the weather begins to get warm.

2. Conditions Prior to Burning. Excellent growth of three-square (Scirpus olineyi) and small patches of bend grass and cattail were present on the areas burned. Marsh was very dense and ranged in height from 2 to 3 feet on an average. Only a few ducks used many of the areas prior to control burning.

3. Conditions following Burning. Estimated burn was 90% on all the Units since winds prevailed from the N.W. and conditions were ideal. Units were burned at intervals to help supply supplementary feeding for waterfowl. All the burned marsh areas were used, however Unit No. 3 adjacent to the Dieffenbach Pool Dike had the heaviest usuage with an estimated 10,000 geese observed on the unit at one time during March.

F. Fires. There were no uncontrolled fires on the refuge during the year. Several drought periods raised the fire index during the summer months. August was considered a fire danger month but fire index was much lower than in the summer and fall of 1963. Several well distributed rains relieved fire danger and by November the index was very low.

IV. Resource Management

A. Grazing. None to report.

B. Haying. None to report.

C. Fur Harvest. Annual fur removal program for 1964 was approved on December 9, 1963 and one local trapper was issued a permit to trap an unlimited number of muskrats from Units No. 2,3,8,9, 16, 17, 18, 19, and 36 adjacent to roads and dikes to eliminate possible damage to the outside structure caused by the muskrats tunneling and burrowing. The local trapper removed 1,459 muskrats from the nine units. Listed below is a tabulation of the trapping results by units.

Trapper	Lic. No.	Permit No.	Unit No.	Muskrat Catch	Raccoon
Ray Willey	80437 Md.	T-6623	2	193	
			3	280	2
			8	110	
			9	319	
			16	70	1
			17	108	
			18	118	
	Raccoons 4		19	109	
Totals	Muskrats 1,459		36	152	1

The Government's share of the muskrat pelts were packed and shipped to the New York Auction Co. on April 10, 1964. One bale shipped by Masten Trucking Co. under B/L B5278572 contained 376 Black Adults, 22 Black kits, 1 Black Cull, 318 Brown Adults, 8 Brown kits and 3 Brown culls or a total of 728.

Sale prices locally for the trappers share of muskrats was 1.75 to 1.90 per Black Adult pelt and 1.35 to 1.45 per Brown adult pelt. Results of the New York Auction Co. sale for the refuge share showed 1.25 for Adult Brown and $1.50 for Adult Black. or a total of $806.07 for 692 muskrats. The remaining 66 pelts were not sold with the first lot. Total receipts for the trappers share sold to a local buyer was $1,170.70 for the 728 muskrats.

D. Timber Removal. Approximately 8,000 B.F. of mixed pine and hardwood timber was sold during 1964. This consisted of one salvage sale to the Dorchester Lumber Co. of Linkwood, Md. under Permit No. 31643 in connection with widen of the Old Mill Road by the Dorchester County Highway Department for future black-topping.

E. Commerical Fishing. Permits were issued to two local fishermen to catch fish by use of gill nets. Success was only fair with a few carp, catfish, herring and perch taken. Total estimated pounds removed was 500.

F. Other Uses. None to report.

V. Field Investigation or Applied Research

A. Progress Report. A total of 2,683 waterfowl were banded by this station in calendar year 1964. A breakdown by species follows:

Canada goose	1,473
Mallards	1,098
Blacks	95
Pintail	11
B.W. Teal	12
G.W. Teal	14
Total	2,683

Most of the Canada goose trapping was done by use of the Cannon Net trap while portable traps were used in duck banding. Extreme cold weather was encountered in January and February with several heavy snowfalls. Pre-season banding was poor due to extremely mild weather in October and early November. No banding was performed during the annual hunting season.

VI. Public Relations

A. Recreational Uses. The public recreational activities of the refuge consists of photographs birdwatching and picnicking. These recreational uses are being participated in more each year and the pressure of their use is being felt by this refuge. The new Visitors Center should relieve the traffic and interruptions from the headquarters office. (We Hope')

The need of a full-time employee to keep the recreational areas and buildings clean is very evident, especially during heavy work load periods.

B. Visitors. Official Visitors during the calendar year 1964 were:

(1) Mr. Lawson, R.O. inspection of contract work on building under APW program - February 10, 1964.

(2) Mr. Jim Landford, R.O. discussed Soil and Moisture Program.

(3) Mr. Luther Goldman and the Eight Departmental Manager Development Group from Washington, D.C. - Show me tour of Blackwater.

(4) Mr. Donald W. Pfitzer, R.O. visited Blakcwater on May 16, 17 and 18 in connection with Recreation Area and Visitors Center.

(5) Mr. Givens and Mr. Pfitzer, R.O. visited on June 15 and 16 for purpose of setting up cases and electrical equipment in new Visitors Center.

(6) Mr. Daniel H. Janzen, Director of Bureau of Sport Fisheries and Wildlife on July 21 and toured the refuge.

(7) Mr. Ervin W. McIntosh, Refuge Manager,Chassahowitzka, Refuge visited the refuge pn October 8 and 9 prior to his transfer on October 29.

(8) Mr. Ted Ball and Mr. Summer Dow, the new East Coast Biologist.

(9) Mr. Robert Young, Branch of Realty, visited the refuge in connection with the Quarters Survey Appraisal.

(10) Mr. Mankla, R.O. and Mr. Morton Smith, Flyway Biologist and other personnel from Patuxent instructed refuge personnel in aging and sexing of waterfowl in late October.

(11) Mr. Luther Goldman and Mr. Robert Britt and Departmental Interior Trainee Group visited the refuge for Show-Me Tour on November 20.

(12) U.S. Game Management Agents included Withers, Wright, Shuffler, Kensinger, Blakemore and Thurman at various times during the year in connection with law enforcement work.

Other Visitors Included:

Numerous Audubon Groups, All age school groups, many miscellaneous visitors wanting information, advise, etc.

C. Refuge Participation. There were varying degrees of participation by refuge personnel in most all visits to the refuge. The outside participation was the meetings with the SCD for Blackwater, Eastern Neck and Martin Refuge in connection with Departmental Memorandums of Agreement and Field Agreements. Also the participation in the annual Cambridge Outdoor Show held in Febuary. Attendance to the three day show exceeded 5,000 persons. Refuge had the mounted bird and mammal exhibit to show the public.

D. Hunting. No hunting is permitted on the refuge. From all reports waterfowl hunting during the Annual hunting season beginning in November and ending in January of 1965 was one of the poorest on record. From field observations hunting success adjacent to the refuge was very poor. We feel the weather was the main factor since it stayed very mild throughout most of the season.

E. Violations. None to report.

F. Safety. There were no accidents to report during calendar year 1964. In fact, the last losttime accident on this station occurred on June 8, 1960 and the last motor vehicle accident occurred on August 17, 1955.

The personnel at Blackwater are proud of their safety record and hope to continue their safety conscious program throughout the comming year without an accident.

Safety meetings have been held both weekly and monthly throughout the year. Some of the topics covered at these meeting during the year are:

(1) Motor Vehicle Safety .
(2) Heavy Equipment Safety.
(3) Light Equipment " .
(4) Shop Safety.
(5) Hand and power tool safety.
(6) Housekeeping Safety.
(7) Water and Boat Safety.
(8) Firearm Safety.
(9) Electrical Safety.
(10) Cannon Net trap and Ammunition Safety.
(11) Law Enforcement Safety.
(12) Personal Safety.
(13) Chemical Safety.

VI. Other Items

A. Items of Interest.

Assistant Manager Jerome T. Carroll was transferred to Yazoo Refuge in

early March. On the 1st of November, Mr. Ervin W. McIntosh, previous Assistant Manager at Chassahowitzka Refuge arrived to fill the vacant position. Arriving at the same time was Refuge Manager (trainee), Mr. Daniel Dudak, a recent MS graduate of V.P.I.

Personnel from this station attended the Law Enforcement Workshop at Mattamuskeet Refuge in early August and assessed the meeting as a valuable asset to the Refuge personnel.

Refuge Manager received a Superior Performance Award in October for work in connection with APW programs at Blackwater and Martin Refuges.

Refuge personnel assisted the navy, local, State Highway Patrol and County officials in locating a Jet Plane which crashed near the refuge in the Big Blackwater River Marsh resulting in the death of the pilot. The Army, Navy and Marines have attempted to remove the plane from the marsh area without success, since it is located about 30 feet deep in the marsh mud and efforts to free it with a heavy crane and other has failed.

Assistant Manager McIntosh attended the waterfowl wing session at Patuxent Refuge from November 29 thru December 4.

Those assisting in the preparation of this report are as follows:

Refuge Manager - Cornelius W. Wallace
Asst. Refuge Manager- Ervin W. McIntosh
Asst. Refuge Manager - Daniel Dudak
Wildlife Technician - Guy W. Willey

B. Photographs. Attached.

Respectfully submitted,

Cornelius W. Wallace

CWWallace:gww

Regional Refuge Supervisor — FEB 3 1965 — Date

Regional Director — Date

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Blackwater N.W. Refuge MONTHS OF January thru April, 1964

(1) Species	(2) Weeks of reporting period 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling							1	1	1	1
Trumpeter										
Geese:										
Canada	25,000	15,000	25,000	35,000	25,000	18,000	25,000	15,000	15,000	15,000
Cackling										
Brant										
White-fronted										
Snow	22	22	59	59	59	59	59	59	59	59
Blue	17	17	52	52	52	52	52	52	52	52
Other										
Ducks:										
Mallard	8,000	8,000	10,000	10,000	10,000	10,000	15,000	15,000	15,000	10,000
Black	7,000	5,000	8,000	8,000	8,000	8,000	10,000	10,000	10,000	5,000
Gadwall										
Baldpate					200	200	200	200	200	500
Pintail	500	500	500	2,000	2,000	500	1,000	1,000	1,000	1,000
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										25
Wood										
Redhead										
Ring-necked	600	500	500	500	500	500	500	500	500	500
Canvasback										
Scaup										
Goldeneye					50	50	50	50		
Bufflehead					25	25	25	25		
Ruddy					50	50	50	50		
Other Merganser	100	100	100	100	100	100	100	100	50	200
Coot:	50	50	50	50	50	50	50	50	100	100

Int. Dup. Sec.,
Wash., D. C. 37944

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Blackwater N.W. Refuge MONTHS OF January thru XX TO April, 19 64

(1) Species	(2) Weeks of reporting period: 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling									28		
Trumpeter											
Geese:	10,000	10,000	15,000	15,000	10,000	10,000	10,000	10,000	2,121,000		
Canada											
Cackling											
Brant											
White-fronted	~~59~~	~~1~~	~~1~~						~~4,039~~		
Snow	~~52~~								~~3,514~~		
Blue											
Other											
Ducks:	8,000	8,000	3,000	3,000	3,000	3,000	1,000	1,000	987,000		
Mallard	~~5,000~~	~~5,000~~	~~3,000~~	~~2,000~~	~~2,000~~	~~2,000~~	~~500~~	~~500~~	~~686,000~~		
Black											
Gadwall	~~500~~	~~500~~	~~500~~	~~500~~	~~500~~	~~500~~			~~31,500~~		
Baldpate	~~1,000~~	~~1,000~~	~~500~~	~~500~~	~~500~~	~~500~~			~~98,000~~		
Pintail	~~500~~	~~500~~	~~500~~	~~500~~	~~500~~	~~500~~			~~21,000~~		
Green-winged teal	~~1,000~~	~~1,000~~	~~1,000~~	~~1,000~~	~~1,000~~	~~1,000~~	~~500~~	~~500~~	~~49,000~~		
Blue-winged teal											
Cinnamon teal	~~25~~	~~25~~	~~25~~	~~25~~	~~25~~				~~1,050~~		
Shoveler					~~25~~	~~25~~	~~25~~	~~25~~	~~700~~		
Wood											
Redhead	~~500~~	~~500~~							~~42,700~~		
Ring-necked											
Canvasback											
Scaup									~~1,400~~		
Goldeneye									~~700~~		
Bufflehead									~~1,400~~		
Ruddy Merganser	~~225~~	~~225~~							~~10,500~~		
Other	~~100~~	~~100~~	~~25~~								
Coot:	~~XXX~~	~~225~~		25	25				6,125		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	28	1	
Geese	2,128,553	35,111	
Ducks	1,930,950	26,925	
Coots	6,125	100	

SUMMARY

Principal feeding areas Refuge grain fields, Dieffenbach Pool, Headquarters Pool #1 and 2 and burned marsh areas.

Principal nesting areas

Reported by C. W. Wallace & G. W. Willey

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

16242

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Blackwater N.W. MONTHS OF May ~~XXX~~ TO August, 19 64

(1) Species	(2) Weeks of reporting period 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	5,000	5,000	1,000	275	275	275	275	275	275	275
Cackling										
Brant										
White-fronted										
Snow					6	6				
Blue										
Other										
Ducks:										
Mallard	1,000	900	950	1050	1100	1175	1200	1250	1325	1400
Black	500	500	525	575	625	650	700	750	800	850
Gadwall										
Baldpate										
Pintail										
Green-winged teal										
Blue-winged teal	500	500	500	500	525	550	625	625	650	675
Cinnamon teal										
Shoveler										
Wood	25	25	25	25	25	25	25	25	25	25
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coot:										

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Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Blackwater N.W. MONTHS OF May Thru ~~XXX~~ TO August, 1964

(1) Species	(2) Weeks of reporting period: 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada	275	275	275	275	275	275	275	275	105,875	0	0
Cackling											
Brant											
White-fronted									84	0	0
Snow											
Blue											
Other											
Ducks:											
Mallard	1450	1500	1525	1575	1625	1700	1900	1900	171,675	89	875
Black	950	1000	1050	1100	1100	1100	1100	1100	104,825	76	600
Gadwall											
Baldpate											
Pintail											
Green-winged teal											
Blue-winged teal	700	750	775	800	850	900	1000	1600	91,375	44	400
Cinnamon teal											
Shoveler											
Wood	25	25	25	25	25	25	25	25	3,150	0	0
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other											
Coot:											

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	105,959	5,000	0
Ducks	371,025	4,625	1,875
Coots			

SUMMARY

Principal feeding areas Headquarters Ponds, Deadwoods, McGraws Island Area, Kushnic Tract areas, Sunken Islands, Meekins Creek & Harpers Pond.

Principal nesting areas Headquarters Pond #1, 2, Little Blackwater River, Islands of the refuge.

Reported by C.W. Wallace & G.W. Willey

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Blackwater N.W. MONTHS OF September thru December, 1964.

(1) Species	(2) Weeks of reporting period 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production Broods seen	Estimated total
Swans:											
Whistling					3				21		
Trumpeter											
Geese:											
Canada	50,000	30,000	50,000	60,000	75,000	50,000	50,000	30,000	5,097,775		
Cackling											
Brant											
White-fronted											
Snow	63	81	96	196	182	182	182	182	9,268		
Blue	38	57	52	52	86	86	86	86	5,005		
Other											
Ducks:											
Mallard	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	1,986,600		
Black	20,000	20,000	20,000	10,000	10,000	10,000	10,000	8,000	1,552,400		
Gadwall									10,500		
Baldpate	500	1,000	5,000	2,000	5,000	1,000	1,000	500	542,850		
Pintail	500	20,000	10,000	5,000	10,000	5,000	10,000	8,000	1,109,500		
Green-winged teal	10,000	5,000	4,000	2,000	5,000	2,000	2,000	500	672,000		
Blue-winged teal	500	500	500						298,200		
Cinnamon teal											
Shoveler	25	25	25	25	25				1,050		
Wood	100	100							8,400		
Redhead			50	50	50				11,550		
Ring-necked	1,000	1,000	1,000	1,000	1,000	2,000	2,000	2,500	116,900		
Canvasback			2,000	2,000	2,000	1,000	5,000	2,000	108,500		
Scaup									17,675		
Goldeneye					50	50			700		
Bufflehead					50	50			700		
Ruddy			100	50	25	25	25	100	8,575		
Other Merganser	250	250	750	750	800	800	800	150	35,350		
Coot:	500	500	500	500	500	500	500	100	42,700		

(Over)

	(5) Total Days Use	(6) Peak Number	7) Total Production
Swans	21	3	
Geese	5,112,048	75,268	
Ducks	6,481,450	111,900	
Coots	42,700	500	

SUMMARY

Principal feeding areas Dieffenbach Pool, Headquarters Pond #1 and 2, Kuehnle Tract Pool. All agricultural fields of the refuge. Burned marsh areas and open marsh areas of the refuge.

Principal nesting areas

Reported by Refuge Mgr. Wallace, McIntosh, Dudak and Wildlife Technician Willey.

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species — In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: — Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: — Average weekly populations x number of days present for each species.

(4) Production: — Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: — A summary of data recorded under (3).

(6) Peak Number: — Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: — A summary of data recorded under (4).

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Blackwater N.W. MONTHS OF September thru December, 1954.

(1) Species	(2) Weeks of reporting period 1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	275	275	275	1,000	20,000	50,000	75,000	75,000	60,000	50,000
Cackling										
Brant										
White-fronted										
Snow					12	18	52	52	63	63
Blue					10	10	38	38	38	38
Other										
Ducks:										
Mallard	1,900	1,900	2,500	2,500	15,000	20,000	20,000	20,000	20,000	20,000
Black	1,100	1,100	1,500	1,500	10,000	20,000	20,000	20,000	20,000	20,000
Gadwall						500	500	500		
Baldpate		50	500	500	5,000	10,000	15,000	15,000	15,000	500
Pintail					10,000	10,000	30,000	15,000	15,000	10,000
Green-winged teal						5,000	20,000	20,000	20,000	500
Blue-winged teal	1,600	2,500	4,000	4,000	10,000	10,000	5,000	3,000	1,000	
Cinnamon teal										
Shoveler										25
Wood	100	100	100	100	100	100	100	100	100	100
Redhead									500	1,000
Ring-necked					200	500	500	500	500	1,000
Canvasback									1,000	500
Scaup					25	500	500	500	500	
Goldeneye										
Bufflehead										
Ruddy					100	200	200	200	200	
Other Merganser							100	100	100	200
Coot						500	500	500	500	500

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Blackwater N.W. Refuge Months of January thru to April 1964

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great Blue Heron	2	2/10/64	40	4/30/64						40
Common Loon	5	4/1/64	30	4/30/64						30
Snowy Egret	3	4/1/64	50	4/30/64						50
Little Blue Heron	1	4/1/64	25	4/30/64						25
Louisiana Heron	3	3/17/64	30	4/30/64						30
Cattle Egret	2	4/27/64	4	4/28/64	4	4/28/64				4
II. Shorebirds, Gulls and Terns:										
Killdeer	60	3/30/64	400	4/30/64				3	0	400
Herring Gull	200	4/15/64	600	4/30/64						600
Laughing Gull	100	4/15/64	500	4/30/64						500
Yellowlegs (lesser)	25	1/1/64	500	4/30/64						500
Yellowlegs (Greater	25	1/1/64	500	4/30/64						500
Semi-palmated Sandpiper	20	4/1/64	300	4/30/64						300
Sanderling	5	4/1/64	225	4/30/64						225
Virginia Rail	20	4/1/64	150	4/30/64						150

(over)

(1)	(2)	(3)		(4)		(5)		(6)
III. Doves and Pigeons:								
Mourning dove		300	4/30/64					300
White-winged dove								
IV. Predaceous Birds:								
Golden eagle		2	1/1/64	1	3/19/64			2
Duck hawk								
Horned owl		50	3/15/64					50
Magpie								
Raven								
Crow		700	3/15/64					700
American Bald Eagle		20	1/1/64			1	0	20
Red-Tailed Hawk		25	3/15/64					25
Sparrow Hawk		50	3/15/64					50
Barn Owl		25	4/30/64			2	5	30

Reported by C. W. Wallace & G. W. Willey

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Blackwater N.W. Refuge Months of May thru XXX August 19 64

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great-Blue Heron	40	5/1/64	100	8/31/64						100
Black-Crowned Night Heron	60	5/1/64	80	8/31/64						80
American Egret	25	5/1/64	800	8/15/64						800
Little Blue Heron	25	5/1/64	300	8/1/64						300
Little Green Heron	25	5/1/64	100	7/30/64	50	8/15/64				100
Least Bittern	25	7/1/64	50	8/1/64						50
Louisiana Heron	30	5/1/64	50	8/31/64						50
Snowy Egret	25	XXX6/1/64	100	8/15/64						100
II. Shorebirds, Gulls and Terns:										
Killdeer	400	5/1/64	700	7/15/64						700
Lesser Yellowlegs	500	5/1/64	800	7/15/64						800
Greater Yellowlegs	500	5/1/64	600	7/15/64						600
Wilson Snipe	200	6/1/64	400	8/31/64						400
Sanderlings	150	6/1/64	450	8/31/64						450
Least Sandpiper	300	5/1/64	600	8/15/64						600
Virginia Rail	150	5/1/64	600	8/31/64						600
Clapper Rail	25	5/15/64	600	8/31/64						600
King Rail	150	5/1/64	700	8/31/64						700

(over)

(1)	(2)		(3)		(4)	(5)		(6)
III. Doves and Pigeons:								
Mourning dove	300	5/1/64	800	8/31/64				800
White-winged dove								
IV. Predaceous Birds:								
Golden eagle								
Duck hawk								
Horned owl	1	7/1/64	10	7/30				10
Magpie								
Raven								
Crow	700	5/1/64	700	5/1/64				700
American Eagle	7	5/1/64	10	8/31/64				10
Red-Tailed Hawk	25	5/1/64	60	8/31/64				60
Broad-Winged Hawk	15	5/1/64	15	8/31/64				15
Coopers Hawk	6	5/1/64	6	8/31/64				6
Barn Owl	30	5/1/64	39	8/31/64		3	9	39

Reported by C.W. Wallace & G.W. Willey

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Blackwater N.W. Months of September XXX thru December 64. 195 to

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great-Blue Heron			50	10/15						50
Black-Crowned Night Heron			50	10/1						50
American Egret			300	9/30						300
Eastern Least Bittern			50	10/15						50
II. Shorebirds, Gulls and Terns:										
Killdeer			500	9/30						500
Lesser Yellowlegs			500	9/30						500
Wilson Snipe			300	10/15						300
Sanderlings			600	10/1						600
Virginia Rail			400	10/15						400
King Rail			600	10/15						600
Clapper Rail			500	10/15						500

(over)

(1)	(2)	(3)		(4)	(5)	(6)
III. Doves and Pigeons:						
Mourning dove						
White-winged dove		800	9/1			800
IV. Predaceous Birds:						
Golden eagle		1	12/31			1
Duck hawk		50	12/31			50
Horned owl						
Magpie						
Raven						
Crow		1,000	12/31			1,000
American Eagle		15	12/31			15
Red-Tailed Hawk		25	12/31			25
Marsh Hawk		100	12/1			100
Sparrow Hawk		25	12/1			25

Reported by C.W. Wallace, E.W. McIntosh, D. Dudak and G.W. Willey.

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C. 9870

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Blackwater N.W. For 12-month period ending August 31, 19 64.

Reported by C.W. Wallace Title Refuge Manager.

(1) Area or Unit Designation	(2) Habitat Type	Acreage		(3) Use-days	(4) Breeding Population	(5) Production
Entire Refuge Area.	Crops	564	Ducks	5,965,775	500	1875
	Upland	1100	Geese	5,691,582	25	0
	Marsh	6816	Swans	28		
	Water	2736	Coots	10,150		
	Total	11216	Total	11,667,535	525	1875
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Blackwater N.W. Refuge Months of January thru to April, 1946

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bob-White Quail	600 acres cropland and 250 acres second growth	1			60% Male				875	Population the same as the preceding period.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Blackwater N.W. Months of May thru August, 1946.

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bob-White Quail	600 acres cropland and 250 acres second growth.	1 +			60% Male				1,000	Increase over same period last year. Large numbers found in the Headquarters and Dieffenbach Pool agricultural areas.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Blackwater N.W. Months of September thru XXXX December, 1964.

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Quail Colinus virginianus virginianus	600 acres of crop-land and 250 acres second growth.	1+			60% Male	0	0	0	1,000	Largest number on record for the refuge. Favorable weather and habitat during past nesting season.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Blackwater N.W. Refuge Year ending April 30, 1964

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator * Control	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Total Population
Muskrat	9,692 acres marsh and ponds	1		1458				T-6623	729	729	728		1	7,300
Bryant Fox Squirrel														150
Grey Squirrel														250
Raccoon				4				T-6623	4	0				550
Red Fox														50
Otter														40
Nutria (S.A.Beaver)				11									11	50
Opossum														170
Skunk														70
Cotton Tail-Rabbit														500

* List removals by Predator Animal Hunter

REMARKS: From observations it appears the squirrel population is lower than that of one year ago. This is based on use of agricultural croplands by squirrels in the period of September thru December, 1963. Also hunting adjacent to the refuge lands netted only a minor kill compared with previous years.

Reported by C.W. Wallac & G. W. Willey

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Blackwater N.W. Calendar Year 1964.

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-Tailed Deer Opocolieus virginanius	Mixed hardwood - softwood swamps and woodlots comprised about 3/4 of the deer habitat. The remainder is comprised of marshland.	60	0	0	0	0	0	U	U	0	0	December	150	60% Male

Remarks: The deer population was estimated through observable activity while performing daily duties. No intensive deer population study has been conducted.

Reported by _____
Wallace. Willey. Dudak and McIntosh

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1755
Form NR-5
60701

DISEASE

Refuge Blackwater N.W. Year 19 64.

Botulism None to report.

Lead Poisoning or other Disease None

Period of outbreak _____

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Kind of disease _____

Species affected _____

Number Affected Species	Actual Count	Estimated

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

NR-6

Bureau of Sport Fisheries and Wildlife

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge Blackwater N.W. Calendar Year 1964.

1. Visits

a. Hunting None b. Fishing 300 c. Miscellaneous 49,700 d. TOTAL VISITS 50,000

1a. Hunting (on refuge lands)

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl	None	None	None
Upland Game	None	None	None
Big Game	None	None	None
Other	None	None	None

Number of permanent blinds 0

Man-days of bow hunting included above 0

Estimated man-days of hunting on lands adjacent to refuge 8,000

1b. Fishing (area open to fishing on refuge lands)

TYPE OF AREA	ACRES	MILES
Ponds or Lakes	5	
Streams and Shores		

1c. Miscellaneous Visits

Recreation 48,000 Official 700

Economic Use 1,000 Industrial 0

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	On Refuge NO. OF GROUPS	On Refuge NUMBER IN GROUPS	Off Refuge NO. Of GROUPS	Off Refuge NUMBER IN GROUPS
Sportsmen Clubs	1	20		
Bird and Garden Clubs	10	600		
Schools	8	500		
Service Clubs	0	0		
Youth Groups	5	80	1	35
Professional-Scientific	1	20		
Religious Groups	5	250		
State or Federal Govt.	3	90		
Other	1	100	4	50

3. Other Activities

TYPE	NUMBER	TYPE	NUMBER
Press Releases	3	Radio Presentations	3
Newspapers (P.R.'s sent to)	1	Exhibits	1
TV Presentations	1	Est. Exhibit Viewers	5,000

3-1756

(Rev. 4/63)

INSTRUCTIONS

Item 1: Total of a, b, and c, equal d.

"Visit" - definition. Any person who is on refuge lands or waters during a day or part thereof for the purpose of: hunting, fishing, bird-watching, recreation, business or economic use, official visit, or similar interest. INCLUDE - those who stop within the refuge while traveling on a public highway because of an interest in the area. EXCLUDE - persons engaged in oil or other industry not directly related to the refuge, persons using refuge as most direct route or principal avenue of traffic, and those boating on navigable rivers or the Intercoastal Canal, unless they stop to observe wildlife on the refuge.

Computing visits. Where actual counts are impractical, "sampling" is used with midweek and weekend samples varied by season or weather. A conversion factor of 3.5 (of passengers per car) is used when accurate figures are not available. Each refuge will develop a conversion factor for boats based on range of usage. Count a camper once for each 24-hour period or fraction thereof.

Item 1a: Acres - of refuge open for each type of hunting.

Managed hunts require check in and out of hunters, issuance of permits, or assignment of blinds.

Other - INCLUDE crow, fox, and similar hunting.

Lands adjacent to refuge. Normally considered within 1 mile or less of boundary, unless established sampling procedures cover a wider area. For big game hunting, the distance may be greater.

Item 1b: Acres of streams open to fishing, if practical; otherwise just miles open. Information on "shores" is primarily for coastal fishing.

Item 1c: Recreation. INCLUDE photography, observing wildlife, picnicking, swimming, boating, camping, visitor center use, tours, etc. TOTAL Recreation, Official, and Economic Use visits under Item 1.

Industrial. INCLUDE persons engaged in industry, i.e., oil industry or factories. EXCLUDE these from Item 1.

Item 2: INCLUDE the "On Refuge" groups in Items 1c and 1. In "Off Refuge" column include only those group meetings in which refuge employees actually participate. EXCLUDE these from Items 1c and 1.

Item 3: Exhibits - INCLUDE displays, fairs, parades, and exhibits OFF the refuge; EXCLUDE those ON.

3-1757
Form NR-7
(April 1946)

PLANTINGS
(Marsh - Aquatic - Upland)

Refuge Blackwater N.W. Refuge Year 1964.

Species	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount & Nature of Propagules	Date of Planting	Survival	Cause of Loss	Remarks
Holly Ilex crenata helleri	Area around Visitors Center		40		July 1964	100%		
Huges texus compacta hicksi								
Lugutrums Ligustrum lucidum recurovifolium								

TOTAL ACREAGE PLANTED:

Marsh and aquatic.....
Hedgerows, cover patches.....
Food strips, food patches.....
Forest plantings.....

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Blackwater N.W. County Dorchester State Maryland

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Buckwheat					114	3420	114	Ladino Clover	113
Corn			35	2,700	62	6200	97	Ryegrass	248
Millet					119	4,165	119	Wheat	57
Sorghum					5	225	5	Soybeans	70
								Fallow Ag. Land	11

No. of Permittees: Agricultural Operations None Haying Operations None Grazing Operations None

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle				
				2. Other				
				1. Total Refuge Acreage Under Cultivation				823
Hay - Wild				2. Acreage Cultivated as Service Operation				823

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.-DUP. SEC., WASH., D.C. 91767

3-1576
NR-88
(4/54)

REFUGE GRAIN REPORT

Refuge Blackwater N.W. Months of January through December, 1964.

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Buckwheat	0	115	115		115		115				
Corn	800	8,464	9,264	2,000	20	2,020	4,040	5,224	0	5,224	0
Ladino Clover	0	2	2		2		2				
Mixed Grain		200	200			200	200				
Soybeans	250		250		250		250				
Millet	0	150	150		150		150				
Sorghum	0	1	1		1		1				
Ryegrass	0	230	230		230		230				

(8) Indicate shipping or collection points 5,264 bushels of corn received from Eastern Neck refuge under co-operative farming agreement as refuge share. 1,000 bushels transferred to Chincoteague Refuge and 1,000 bushels shipped to Game Management Division for banding operations. 1,750 bushels stored in corn bins at Blackwater. Other stored at Baugh Chemical Co. in Cambridge for use in banding operations at Blackwater in 1965. Buckwheat, Sorghum

(9) Grain is stored at

(10) Remarks Ladino Clover, millet and ryegrass received from Eastern Service Corp. for planting in refuge fields.

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., WASH., D.C. 17065

3-1759
Form NR-9
(April 1946)

COLLECTIONS AND RECEIPTS OF PLANTING STOCK
(Seeds, rootstocks, trees, shrubs)

Refuge Blackwater N.W. Year 19X 64.

Species	Collections				Receipts		Total Amounts on Hand	Amount Surplus
	Amount	Date or Period of Collection	Method	Unit Cost	Amount	Source		
None to report.								

Interior Duplicating Section,
Washington 25, D. C. 84267

3-1760
Form NR-10
(April 1946)

HAYING AND GRAZING

Refuge Blackwater N.W. Year 1964.

Permittee	Permit No.	Unit or Location	Actual Acreage Utilized	Animal Use Months	Tons of Hay Harvested	Period of Use From -- To	Rate	Total Income	Remarks
	None to report.								

Totals:

Acreage grazed..... Animal use months..... Total income Grazing.....

Acreage cut for hay..... Tons of hay cut..... Total income Haying.....

Interior--Duplicating Section, Washington, D. C.

18268

3-1761
Form NR-11
(2/46)

TIMBER REMOVAL

Refuge Blackwater N.W. Year 1964.

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
Dorchester Lumber Co. Inc.	31643	Compartment No. 1 Kentuck SWamp.	1/2 Acre	8,000 B.F.		210.00	Clear Cut	Pine & mixed hardwoods
			Above logs slavage timber removed in connection with widen of Old Mill Road by the Dorchester County Highway Department for future black-topping.					

Total acreage cut over..... Total income $210.00

No. of units removed B. F..... Method of slash disposal.....

Cords.....

Ties.....

.....

INT.-DUP. SEC., WASH., D.C. 36103

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge: Blackwater National Wildlife

Proposal Number: 1

Reporting Year: 1964

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
June 10 11	Pig Weed Rag Weed Morning Glory Dock	Refuge Corn Fields A,E,J, L and O.	97	2,4 Dichlorophenoxyacetic Acid	3 gallons	1/2 pt. or 8 ozs per Acre	Water 8 gallons per acre	Tractor Mounted Sprayer

10. Summary of results (continue on reverse side, if necessary)

Spraying resulted in the increase in corn yield at Blackwater since it eliminated approximately 80% of the pest weeds listed above under (2). No adverse effects were observed and conditions were good during the period of application. Corn yield was 100 bushels per acre whereas if no weed control had been applied under normal conditions the yield would have been approximately 60 bushels per acre. It also saved one cultivation and this cut the cost of growing the corn crop.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PERSTICIDE APPLICATION

Refuge: Blackwater National Wildlife

Proposal Number: 2

Reporting Year: 1964.

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Weekly June 1 thru Sept. 15.	Mosquitoes (All types)	Headquarters Area including grounds around office, Equipment Buildings, Qtrs #1, 2, 3 and 4. and Picnic Area. Visitors Center grounds at Dieffenbach Pool Unit.	10	Malathion Dibrom	14 gallons Malathion 14 gallons Dibrom	1 Gallon Malathion 1 Gallon Dibrom	Water 98 gallons per 100 gallon tank	Mist Type Sprayer (Truck Mounted Rotmist Model)

10. Summary of results (continue on reverse side, if necessary)

Spraying performed by the County approved by the Maryland Mosquito Control Division. A total of 14 spraying during the period from June 1 thru September 15. Control of the Mosquitoes resulted in more use of the Recreational facilities on the refuge as well as benefit to personnel and families to carry out work programs and day to day living. No adverse effects were observed and after each application the spraying had little to no effect on the new crop of mosquitoes which moved into the areas.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fis' ries and Wildlife

ANNUAL REPORT OF PERSTICIDE APPLICATION

Refuge: Eastern Neck N.W. & Blackwater N. W. Refuge

Proposal Number: 1

Reporting Year: 1964.

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
May 10 thru 15	Pig Weed Rag Weed Morning Glory	Corn Fields on the Wickcliffe and Ingleside Farms.	~~130½~~ 130½	Atrazine 80W	161 lbs	2 lbs p/a	Water 20 gallon per Acre	Tractor Mounted Sprayer

10. Summary of results (continue on reverse side, if necessary)

Atrazine was used by the Co-operative farmer during 1964 on corn since many of the fields on this new refuge had been used by livestock over a period of years and weeds would have been a problem. Results of the application showed 90% kill of all weeds and grass and this help increase corn yields for both the Service and co-operative farmer. No adverse effects could be observed from this approved pesticide control application.

Photo. #1 - Banding of mallards in portable type traps at headquarters #42-597

Photo. #2 - Note numbers of mallards trapped in portable traps in banding operation. #42-598

Photo #3 - Geese feeding in clover field in rear of headquarters office. #42-599

Photo #4 - Geese feeding on millet in rear of visitors center. Picture taken from dike of Dieffenbach Pool. #42-600

Photo. #5 - Canada geese first arrival feeding on buckwheat in Refuge field B. #42-601

Photo. #6 - Waterfowl feeding on millet in Dieffenbach Pool Unit. #42-602

Photo. #7 Canada geese feeding on Ladino Clover in Refuge field C.
#42-603

Photo. #8 Canada geese feeding on buckwheat on Refuge field B.
#42-604

Photo. #9 Ladino clover producing a good stand in Refuge field I.
#42-605

Photo. #10 Milo growing in Dieffenbach Pool area adjacent to plane runway.
#42-606

Photo. #11 Results of goose browsing on Refuge fields in Dieffenbach Pool Unit. #42-607

Photo. #12 Winter Wheat growth on newly cleared Refuge land. #42-608

Photo. #13 Corn in growing stage in Refuge fields.
#42-609

Photo. #14 Strip harvesting of corn in Refuge fields by local operator.
#42-610

Photo. #14 Preparing to apply soil amendments on Refuge fields.
#42-611

Photo. #15 Dense growth of soybeans to be plowed under in connection with soil and moisture program in Refuge fields.
#42-612

Not much landscaping here!

Photo. #16 More soybeans to be plowed under in connection with soil and moisture program. Visitors center in the background. #42-613

Photo. #17 Planting corn in Refuge field by local operator. #42-614

Photo. #18 Soybeans being plowed under in connection with soil and moisture program. #42-615

Photo. #19 Same as above.
#42-616

Photo. #20 Spreader used in applying soil amendments and seeding of new dike bank slopes. #42-617

Photo. #21 Results of seeding new dike slopes. #42-618

Photo. #22 Buckwheat and ryegrass plus other perineals planted on new dike slopes. #42-619

Photo. #23 Results of soil amendments and seeding new road edges. #42-620

Photo. #24 Deer feeding on new road edge recently seeded.
#42-621

Photo. #25 New road leading to Kuehnle Tract.
#42-622

Photo. #26 Kuehnle Tract road leading to new dike.
#42-623

Photo. #27 Water impoundment at Kuehnle Tract.
#42-624

Photo. #28 Early growing stage of corn in Dieffenbach Pool Unit.
Visitors center in background. #42-625

Photo. #28A Corn in Refuge field.
#42-626

Photo. #29 Placing salvage concrete at road edge in headquarters impoundment to reduce erosion. #42-627

Photo. #30 Refinishing road edge of headquarters pond after placing salvage concrete. #42-628

Photo. #31 Field trip to Blackwater by Pocomoke Chapter of Soil Conservation Service. #42-629

Photo. #32 Soil conservation Group having refreshments at picnic area. #42-630

Photo. #33 Local church group at picnic area.
#42-631

Photo. #34 Refuge manager enjoying picnic area along with local group. #42-632

Photo. #35 Soil Cpnservation group assembled at Visitors Center.
#42-633

Photo. #36 N ote parked cars at picnic area.
#42-634

Photo. #37 School group visiting Blackwater Refuge.
#42-635

Photo. #38 School group picnicking at Blackwater Refuge.
#42-636

Photo. #39 Hay riding and picknicking at Blackwater Refuge.
#42-637

Photo. #40 School group visiting and picnicking on Blackwater Refuge.
#42-638

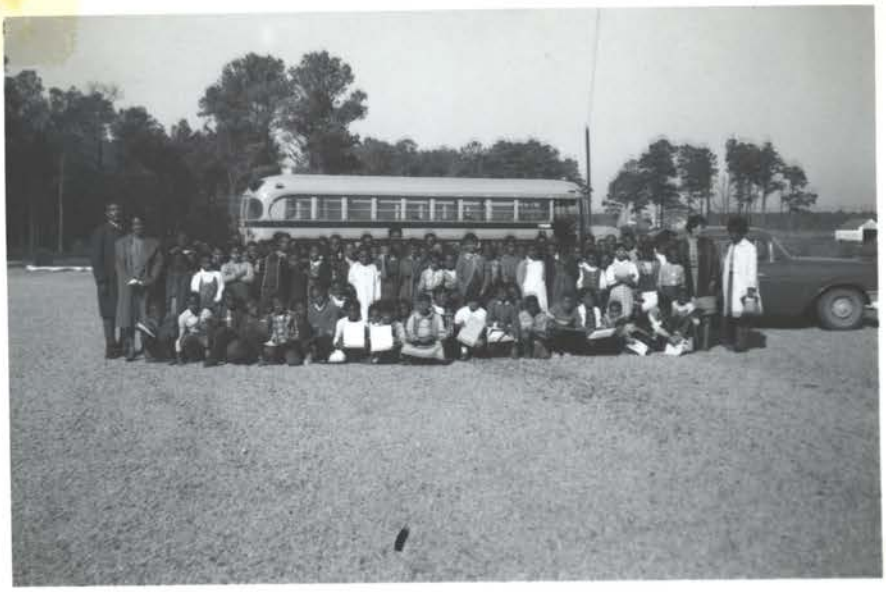

Photo. #41 School group visiting Blackwater Refuge.
#42-639

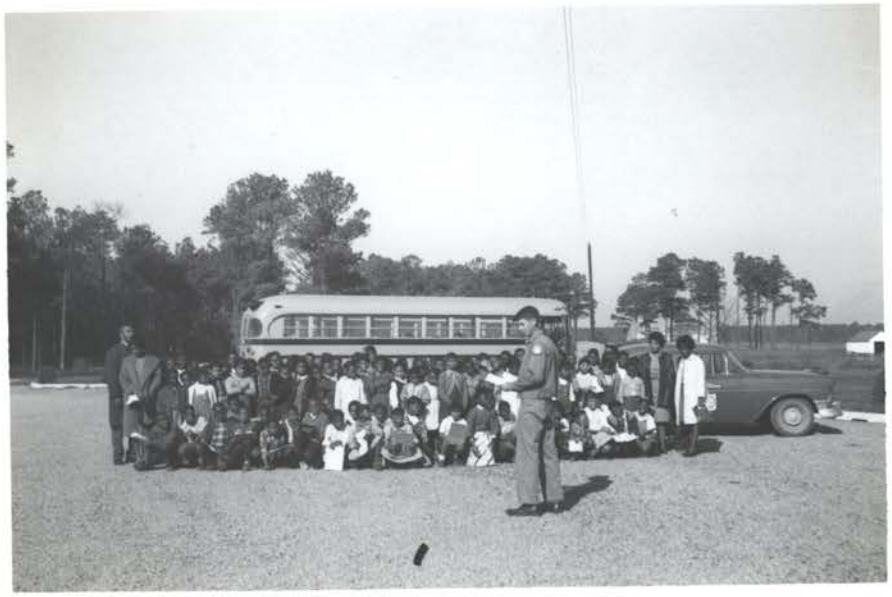

Photo. #42 Asst. McIntosh giving talk to school group on Blackwater Refuge. #42-640

Photo. #43 School group visiting Refuge.
#42-641

Photo. #44 Picnicking on Blackwater Refuge.
#42-642

Photo. #45 Posting the Susquehanna Refuge by means of poles, red flages and Refuge signs. #42-643

Photo. #46 Looking north at Battery Island, Headquarters for Susquehanna N.W. Refuge. #42-644

Photo. #47 On patrol at Suaquehanna Refuge and vicinity.
#42-645

Photo. #48 Maintenance man Stewart with Susquehanna boat and Boundry markers, making plans to post the Refuge. #42-646

Photo. #49 Battery Island boat harbor on Susquehanna N.W. Refuge.
#42-647

Luther –
what a
piker you
are
WA

I'll stay with my
400 mm. Can't
imagine hand-hold-
ing this thunder
bus. [illegible]

Photo. #50 Mr. Albert Molvay of The National Geographic Society unpacks his 1000 mm. telephoto lenses for taking close-up of Wildlife Refuge.
#42-648

Blake Carroll
Baker [illegible]

what a pair !?

Photo. #51 Former Agent Shuffler takes a peak through the large telephoto lenses. #42-649

Photo. #52 Flag flying at half mast in Honor of our late President Herbert Hoover. #42-650

Photo. #53 Blackwater National Wildlife Refuge office.
#42-651

Photo. #54 Soil conservation group inspecting new dike on west side of Refuge.
#42-652

Photo. #55 Corn field near tenant house on Eastern Neck Island Refuge. #42-653

Photo. #56 Old club house on Eastern Neck Island Refuge. #42-654

Photo. #57 Old club house on Eastern Neck Refuge.
#42-655

Photo. #58 Tenent house on Eastern Neck Island Refuge.
#42-656

Photo. #59 Old buildings and sheds on Eastern Neck Island Refuge.
#42-657

Photo. #60 Corn field on Eastern Neck Island Refuge.
#42-658

Photo. #61 Corn field on Eastern Neck Island Refuge.
#42-659

Photo. #62 Soybean field in Eastern Neck Island Refuge.
#42-660

Photo. #63 Corn field in Eastern Neck Island Refuge.
#42-661

Photo. #64 Corn field on Eastern Neck Island Refuge.
#42-662

Photo. #65 Wildlife technicion Willey checking the rear of old club house on Eastern Neck Island Refuge. #42-663

Photo. #66 Manager looking over the condition of the old club house on Eastern Neck Island Refuge. #42-664

Photo. #67 L.C.M. barge a unit to the Martin Refuge.
#42-665

Photo. #68 Boat house near completion at Martin Refuge.
#42-666

Photo. #69 Load of ryegrass seed ready for transfer to local plane in seeding operation on Refuge Fields. #42-667

Photo. #70 Loading ryegrass seed on plane for seeding Refuge fields. #42-668