

STATE: DELAWARE

GRANT: W37R-11

ANNUAL REPORT

GRANT TITLE: WILDIFE INVESTIGATIONS – WATERFOWL

GRANT PERIOD: OCTOBER 1, 2009 – SEPTEMBER 30, 2010



STATE: Delaware

GRANT NUMBER AND TITLE:

W 37-R Wildlife Investigations - Waterfowl

OBJECTIVE:

To maintain waterfowl populations at sustainable and socially acceptable levels while maximizing recreational use of the resource.

JOB NUMBER AND TITLE:

Job 1. Migratory Bird Inventories, Banding, Parts Collection and Parts Analysis

JOB OBJECTIVE:

To cooperate with the U.S. Fish and Wildlife Service (USFWS) and the Atlantic Flyway Council Technical Section (AFCTS) as follows:

To conduct aerial waterfowl surveys

To trap and band migratory birds, including doves.

To conduct Singing-ground Surveys to establish an index of American woodcock breeding numbers.

To conduct Call-count Surveys to establish an index of mourning dove breeding numbers.

To participate in the waterfowl parts analysis workshop.

To assist in the collection of dead waterfowl or parts as requested for evaluation of disease or toxic materials.

ACTIVITY:

Monthly aerial waterfowl surveys were conducted monthly by Delaware personnel from October 2009 through January 2010. Survey dates were: 14, 15, 19 October, 5, 9, 10 November, and 14, 17, 18 December. The mid-winter waterfowl survey was flown on 6, 7, 8, January 2010. Post-season banding of American black ducks occurred in February and March and total of 151 black ducks and 14 black duck/mallard hybrids were banded and released. Additional banding activities included capturing and banding 133 mourning doves as part of the National Mourning Dove Banding Study . American woodcock Singing-ground Surveys, as requested by the USFWS, were not conducted because all DE routes are current in 'constant zero' status. Two

mourning dove Call-count Survey were conducted during this segment on 2 and 3 June 2010 at the request of the USFWS. An aerial inventory of resident geese in Delaware was flown between 9 July and 30 July 2010 to document the number of birds present in the state at that time. Data was expanded to correct for visibility. No correction for reproduction was included as the survey was flown at the end of the nesting season.

TARGET DATE:

September 30, 2010

STATUS:

On schedule – pre approved extension.

REMARKS:

In 2010, no routes were surveyed for American woodcock because all DE routes (DE-018, DE-017, DE-014) are in ‘constant zero’ status. Mourning dove call counts were conducted along two routes, DE-0091 and DE-0100, and the total number of doves seen along each route was 13 and 9, respectively. *(Note: Final reports for the American woodcock Singing-ground Surveys and mourning dove Call-count Surveys will be published by the U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Laurel, Maryland.)*

As a cooperator in the mourning dove national banding study 133 doves (36 AHY, 97 HY, and 1 UNK) were banded across the state during July and August 2010. Banding data were submitted to the Bird Banding Laboratory. The use of “wing barrels” to collect hunter-harvested dove wings and obtain the age composition of harvested doves was discontinued this year because the USFWS has established a mail-based mourning dove harvest survey using randomly-selected hunters to obtain this information.

A postseason black duck banding program was conducted in Delaware during February and March 2010 in support of the Black Duck Joint Venture’s 5-year pilot project to evaluate a 2-season (pre- and post- hunting season) banding program for black ducks in eastern North America. Division personnel banded 96 black ducks and 11 mallard x black duck hybrids at Fresh Pond in Sussex County, Delaware and with the assistance of refuge staff banded an additional 55 black ducks and 3 mallard x black duck hybrids at Bombay Hook National Wildlife Refuge in Kent County. Non-target species captured and banded during these combined activities included 1 gadwall, 5 wood ducks, 28 mallards, and 4 Canada geese.

Monthly aerial waterfowl count data are used by DFW to evaluate seasonal waterfowl movements and abundance. In addition, January survey data were submitted to the USFWS as part of the Midwinter Survey. Monthly counts for October 2009 through January 2010 are included as Tables 1-4. Survey zone boundaries are shown in Figure 1.

Canada goose population levels, based on monthly aerial surveys, are shown in Table 5. Canada goose population levels were above 2008-09 levels by 14,000 geese (100%) in October and 17,000 geese (81%) in November, but were 15,000 (22%) and 1,000 (2%) birds below December and January estimates for these same time periods last year, respectively. Goose population estimates from 2009-10 remain below pre-decline (1976-1980) estimates for all monthly survey periods except December, which was 2% above the pre-decline mean (Table 5).

However, when compared to the short-term, 10-year mean population (1999-2008), Canada geese population estimates for 2009-10 were below average for all months, most notably January (Table 5). The main concentrations of Canada Geese were found in Zones 3 and 5 (Tables 1-4).

Snow goose population estimates from the 2009-10 surveys were above 2008-09 estimates for the early season months of October and November by 300% (12,000 birds) and 12% (6,000 birds), respectively (Table 6). However, in the late season months of December and January, perhaps in response to the harsh winter conditions (persistent January snow cover) observed in Delaware, snow goose numbers were below average by 9% (20,000 birds) in December and 63% (90,000 birds) in January (Table 6). Monthly population estimates were considerably lower when compared to the 10-year (1999-2008) population mean for all months except December, with 59 to 81% fewer geese observed during the 2009-10 survey period (Table 6). However the December survey estimate was 15% (25,000 geese) above the 10-yr mean (Table 6). Snow geese were most abundant in the central part of the state (Zones 4, 5, 6, and 7), primarily in association with the Bombay Hook and Prime Hook National Wildlife Refuges and the Little Creek/Ted Harvey Wildlife Management Areas (Tables 1-4).

The total number of ducks observed during 2009-10 survey period was below average compared to monthly mean numbers observed during the previous 10-year period (1999-2008) for all months except December (Figure 2). The observed numbers of ducks were especially low in October and November, down 54% and 23% respectively, compared to the preceding 10-year mean (Figure 2). This observed decrease was driven primarily by fewer observed northern pintail (Figure 3) and American green-winged teal (Figure 4). In December, the survey estimate was 77% above the mean estimate, corresponding with above average numbers of northern pintail (Figure 3) and American green-winged teal (Figure 4). The number of ducks observed in January 2010 was 20% below the short-term, 10-year average (Figure 2).

American green-winged teal (hereafter teal), northern pintail, mallard, and American black duck (hereafter black duck) were the most abundant species observed during the 2009-2010 survey period (Tables 1-4). In October and November, teal and northern pintail are the most abundant duck species in Delaware, but observed numbers usually decline dramatically by December as these birds migrate further southward (Figure 5). Conversely, late season migrants such as mallards, black ducks, and diving ducks (e.g. ring-necked ducks and ruddy ducks), continue to increase in abundance during the fall, and reach peak observed numbers in December and January (Figures 5, 6, and 7). The 2009-10 survey followed these trends, with several exceptions. Observed numbers of both pintail and teal were 68% (Figure 3) and 52% (Figure 4) below the short-term, 10-yr mean, respectively for the month of October. But interestingly, December survey estimates for these two species were well above average, with pintail 174% above the mean estimate (Figure 3) and teal 281% above the mean estimate (Figure 4). Mallard (Figure 6) and black duck (Figure 7) monthly estimates showed no marked differences compared to the 10-yr mean.

A statewide aerial survey of resident Canada geese was conducted between 9 July and 30 July 2010. All potential goose habitat including wetlands, agricultural, residential, and industrial tracks were examined within the six survey zones (Figure 8). A total of 5,440 adult and juvenile geese were observed (Table 7). Observed estimates were expanded by 2X to correct for lack of visibility due to vegetative cover. The total statewide population of resident geese was estimated to be 10,880 birds in 2010.

The 2010 survey estimate represents a 34% decrease from the 14,576 birds estimated in the 2009 survey. Survey results for 2010 indicate that while a decrease in numbers was observed

compared to the 2009 survey, this year's population estimate is still the second highest on record since the survey began in 2000. Observed numbers of geese were fewer for all units, except D and E, which represent the southwestern and south-central portions of the state, areas that coincidentally had the lowest populations of resident goose in 2000 when the survey began. The preliminary HIP harvest estimate for the 2009 September resident goose season was 1,400 geese in Delaware, a 36% decrease compared to the 2008 estimate of 2,200 geese, despite the continued 10-day extension of the season that began in 2008. The total harvest of Canada geese (resident and migratory) in Delaware decreased by 13%, from an estimated 28,637 geese in 2008 to 24,900 geese in 2009. The 2008 harvest was the highest since hunting resumed for migratory geese in 2001.

RECOMMENDATIONS:

This job should be continued as most aspects are in cooperation with the USFWS and the Atlantic Flyway Council Technical Section (AFCTS). The aerial waterfowl survey methodology should be revised to focus on a smaller area comprising the core waterfowl area in Delaware, primarily Zones 5, 6, and 7. To help account for factors such as weather, tide, hunting pressure, etc. that can influence the presence of migratory birds within the survey area, the proposed core survey area should be flown multiples times per month to help generate a more precise estimate of distribution and relative abundance of waterfowl in Delaware. The traditional survey area will be flown every January as part of the Mid-Winter Survey as well as periodically (every 3-5 years) during the months of October, November, and December.

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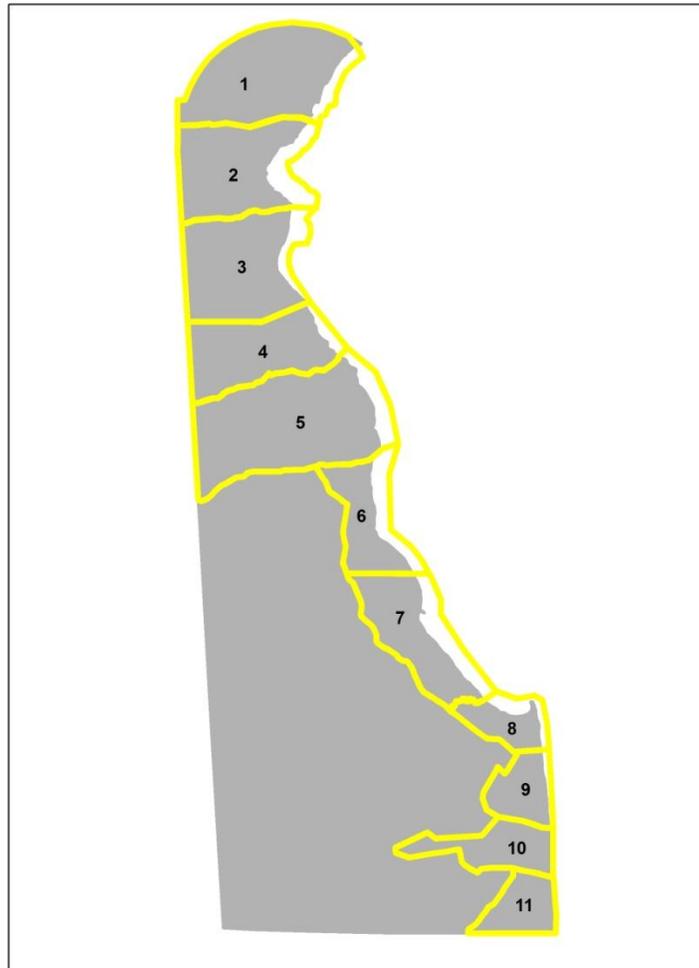


Figure 1. Waterfowl aerial survey zones:

- 1 (Statewide) PA line south to DE Memorial Bridge
- 2 (Statewide) DE Memorial Bridge to C&D Canal
- 3 (Statewide) C&D Canal to line from Liston Point to Kenton
- 4 (Statewide) Liston Point to Route 6 (Smyrna)
- 5 (Statewide) Route 6 (Smyrna) to Route 8 (Port Mahon)
- 6 (East of Route 113) Route 8 to Big Stone Beach
- 7 (East of Route 1) Big Stone Beach to Broadkill River
- 8 (East of Route 1) Broadkill River to Lewis-Rehoboth Canal, south of Gordon's Pond
- 9 South of Gordon's Pond and all of Rehoboth Bay
- 10 All Indian River Bay west to Millsboro and south to Salt Pond
- 11 Salt Pond south to MD line and west to Route 17

Table 1. Delaware aerial waterfowl count flown 14, 15, 19 October 2009 for eleven sampling units.

Species	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	Total
Atlantic Brant	0	0	0	0	0	0	0	0	0	0	0	0
Canada Goose	2103	1093	9268	1850	6626	1893	1912	2063	60	150	1244	28262
Snow Goose	200	0	0	0	4250	0	8600	3060	0	0	0	16110
American Black Duck	0	3	47	55	747	1160	1238	362	21	4	160	3797
Mallard	155	45	76	590	371	166	401	400	0	54	64	2322
Northern Pintail	0	12	0	0	1820	1280	4415	200	0	0	60	7787
American Green-winged Teal	0	0	235	40	2757	1750	14940	0	0	0	0	19722
Blue-winged teal	0	0	0	0	0	0	180	0	0	0	0	180
Gadwall	0	0	0	0	470	261	36	0	0	0	0	767
American Wigeon	0	0	0	0	0	2	0	0	0	0	0	2
Northern Shoveler	0	0	0	0	282	724	190	160	0	0	50	1406
Wood Duck	0	0	0	0	0	0	57	0	0	0	0	57
Canvasback	0	0	0	0	0	0	0	0	0	0	0	0
Redhead	0	0	0	0	0	0	0	0	0	0	0	0
Scaup Spp.	0	0	0	0	0	0	0	0	0	0	0	0
Ring-neck Duck	0	0	0	0	0	0	0	0	0	0	0	0
Common Merganser	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Merganser	0	0	0	0	0	0	0	0	0	0	0	0
Hooded Merganser	0	0	0	0	0	0	0	0	0	0	0	0
Ruddy Duck	0	0	0	0	0	2	0	0	0	0	0	2
Scoter Spp.	0	0	0	0	0	0	0	0	0	0	0	0
Bufflehead	0	0	0	0	0	0	0	0	0	0	0	0
Long-tailed Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mute Swan	11	0	0	2	0	0	0	0	0	0	1	14
Tundra Swan	0	0	0	0	0	0	10	0	0	0	0	10
Total Ducks	155	60	358	685	6447	5345	21457	1122	21	58	334	36042
Total Canada Geese	2103	1093	9268	1850	6626	1893	1912	2063	60	150	1244	28262
Total Snow Geese	200	0	0	0	4250	0	8600	3060	0	0	0	16110
Grand Total	2469	1153	9626	2537	17323	7238	31979	6245	81	208	1579	80438

Table 2. Delaware aerial waterfowl count flown 5, 9, 10 November 2009 for eleven sampling units.

Species	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	Total
Atlantic Brant	0	0	0	0	0	0	0	0	115	78	0	193
Canada Goose	2927	1050	7469	5509	9041	2200	4534	3496	708	245	625	37804
Snow Goose	0	0	0	3000	37100	500	14200	0	0	0	0	54800
American Black Duck	4	0	0	209	1079	997	1468	267	112	202	270	4608
Mallard	20	54	38	853	2064	1140	961	120	58	60	175	5543
Northern Pintail	0	0	0	100	7555	356	12740	1	0	0	336	21088
American Green-winged Teal	0	0	0	0	10081	3662	14824	0	0	0	0	28567
Blue-winged teal	0	0	0	0	0	20	0	0	0	0	0	20
Gadwall	0	10	0	0	318	225	195	15	0	0	47	810
American Wigeon	0	10	0	0	45	80	80	0	0	0	15	230
Northern Shoveler	600	0	20	0	355	155	260	50	0	60	0	1500
Wood Duck	0	0	0	0	0	5	20	0	0	0	0	25
Canvasback	0	0	0	0	0	0	0	0	0	0	0	0
Redhead	0	0	0	0	0	0	0	0	0	0	0	0
Scaup Spp.	0	0	0	0	0	0	0	0	0	0	0	0
Ring-neck Duck	200	15	0	0	0	24	0	0	0	0	0	239
Common Merganser	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Merganser	0	0	0	0	0	0	0	0	2	0	0	2
Hooded Merganser	0	0	0	0	0	3	0	0	10	0	3	16
Ruddy Duck	200	0	100	0	0	0	0	0	0	0	0	300
Scoter Spp.	0	0	0	0	0	0	0	0	0	7	0	7
Bufflehead	0	0	0	0	0	0	0	150	205	199	0	554
Long-tailed Duck	0	0	0	0	0	0	0	0	7	0	0	7
Mute Swan	0	0	0	0	0	0	0	0	0	0	3	3
Tundra Swan	0	0	0	0	90	0	68	0	0	0	0	158
Total Ducks	1024	89	158	1162	21497	6667	30548	603	394	528	846	63516
Total Canada Geese	2927	1050	7469	5509	9041	2200	4534	3496	708	245	625	37804
Total Snow Geese	0	0	0	3000	37100	500	14200	0	0	0	0	54800
Grand Total	3951	1139	7627	9671	67728	9367	49350	4099	1217	851	1474	156474

Table 3. Delaware aerial waterfowl count flown 14, 17, 18 December 2009 for eleven sampling units.

Species	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	Total
Atlantic Brant	0	0	0	0	0	0	0	0	150	410	0	560
Canada Goose	7447	2346	18519	3306	9745	3220	5588	2635	471	375	260	53912
Snow Goose	0	0	8000	22600	113910	2000	27000	1500	4000	0	15000	194010
American Black Duck	220	26	306	388	1460	2721	3390	312	408	281	277	9789
Mallard	327	607	1492	324	4926	616	3959	46	86	140	36	12559
Northern Pintail	0	0	0	20	1641	225	16201	0	0	0	5	18092
American Green-winged Teal	0	0	10	0	2110	2000	22120	150	0	0	0	26390
Blue-winged teal	0	0	0	0	0	0	0	0	0	0	0	0
Gadwall	0	2	0	10	457	701	412	2	17	0	10	1611
American Wigeon	0	0	0	0	20	17	50	0	1	1	0	89
Northern Shoveler	1025	32	25	0	185	552	336	120	0	0	0	2275
Wood Duck	0	0	0	0	0	0	7	0	0	0	0	7
Canvasback	0	0	0	0	0	0	0	0	600	0	0	600
Redhead	0	0	0	0	0	0	0	0	0	0	0	0
Scaup Spp.	0	0	0	0	0	0	30	0	0	0	0	30
Ring-neck Duck	0	0	0	0	0	0	20	0	0	312	0	332
Common Merganser	0	0	4	0	0	0	0	0	0	0	0	4
Red-breasted Merganser	0	0	0	0	0	0	0	0	0	20	0	20
Hooded Merganser	0	0	0	0	0	8	0	0	4	2	0	14
Ruddy Duck	2000	0	0	0	15	200	0	100	0	0	164	2479
Scoter Spp.	0	0	0	0	0	0	0	0	0	5	0	5
Bufflehead	0	2	0	0	0	0	0	6	548	1133	88	1777
Long-tailed Duck	0	0	0	0	0	0	0	0	5	22	0	27
Mute Swan	1	12	0	0	0	0	0	0	0	0	0	13
Tundra Swan	0	0	37	0	114	22	101	0	0	0	0	274
American Coot	0	0	213	0	8	1049	150	0	0	20	0	1440
Total Ducks	3572	669	1837	742	10814	7040	46525	736	1669	1916	580	76100
Total Canada Geese	7447	2346	18519	3306	9745	3220	5588	2635	471	375	260	53912
Total Snow Geese	0	0	8000	22600	113910	2000	27000	1500	4000	0	15000	194010
Grand Total	11020	3027	28606	26648	134591	13331	79364	4871	6290	2721	15840	326309

Table 4. Delaware aerial waterfowl count flown 6, 7, 8 January 2010 for eleven sampling units.

Species	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	Total
Atlantic Brant	0	0	0	0	0	0	0	0	131	373	0	504
Canada Goose	1027	5477	10592	3933	7770	6255	4551	2917	2810	1965	852	47297
Snow Goose	0	0	3000	3345	24200	10521	2014	11000	0	0	0	54080
American Black Duck	73	70	192	198	3011	3337	3139	447	307	800	151	11574
Mallard	240	159	309	337	3484	2663	1974	193	121	435	67	9915
Northern Pintail	0	0	0	0	0	51	1942	0	0	0	0	1993
American Green-winged Teal	0	0	0	0	2	7	0	30	0	0	0	39
Blue-winged teal	0	0	0	0	0	0	0	0	0	0	0	0
Gadwall	0	0	0	0	20	562	4	0	0	0	0	586
American Wigeon	0	0	0	0	0	12	35	0	0	0	0	47
Northern Shoveler	300	0	10	0	0	8	0	195	0	0	0	513
Wood Duck	0	0	0	0	4	0	0	0	0	0	4	4
Canvasback	0	0	0	0	0	0	0	0	850	0	0	850
Redhead	0	0	0	0	0	0	0	0	0	0	0	0
Scaup Spp.	1000	0	0	0	0	2	0	0	0	0	0	1002
Ring-neck Duck	0	70	0	0	0	0	20	0	0	0	0	90
Common Merganser	36	2	0	0	2	135	21	0	0	0	0	196
Red-breasted Merganser	0	0	0	0	0	0	0	0	2	1	0	3
Hooded Merganser	0	0	0	0	0	0	6	0	0	0	0	6
Ruddy Duck	0	60	10	0	60	71	0	0	0	60	25	261
Scoter Spp.	0	0	0	0	0	0	0	0	0	0	0	0
Bufflehead	0	0	0	0	2	0	0	0	400	837	24	1239
Goldeneye	0	0	0	0	0	0	0	0	6	72	0	78
Long-tailed Ducks	0	0	0	0	0	0	0	0	0	6	0	6
Mute Swan	3	12	0	0	0	0	0	0	0	0	0	15
Tundra Swan	0	0	60	0	65	0	54	0	36	0	0	215
Total Ducks	1652	373	521	535	6585	6848	7141	865	1686	2211	271	28688
Total Canada Geese	1027	5477	10592	3933	7770	6255	4551	2917	2810	1965	852	48149
Total Snow Geese	0	0	3000	3345	24200	10521	2014	11000	0	0	0	54080
Grand Total	2679	5850	14173	7813	38620	23624	13760	14782	4663	4549	1123	130513

Table 5. Comparison of 2009-2010 population estimate of Canada geese (in thousands) to pre-decline (1976-1980) and 10-year (1999-2008) mean estimates for each monthly survey period in Delaware.

Survey Period	Year											\bar{X}_1	% Δ	\bar{X}_2	% Δ
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	(1976-1980)	(1999-2008)		
October	20	27	44	51	32	32	25	37	39	14	28	147	-81%	35	-13%
November	34	64	49	62	38	40	45	40	40	21	38	57	-33%	46	-12%
December	46	56	65	55	66	71	39	60	44	69	54	53	2%	55	-5%
January	61	123	64	95	91	67	74	57	68	48	47	56	-14%	81	-37%

Table 6. Comparison of 2009-2010 population estimate of snow geese (in thousands) to 10-year (1999-2008) mean estimate for each monthly survey period in Delaware.

Survey Period	Year										\bar{x} (1999-2008)	% Δ	
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008			2009
October	193	141	128	113	59	78	15	24	68	4	16	82	-81%
November	343	126	195	228	328	99	92	124	33	49	55	162	-66%
December	152	255	199	129	230	89	145	222	54	214	194	169	15%
January	61	169	123	167	169	52	155	193	92	144	54	133	-59%

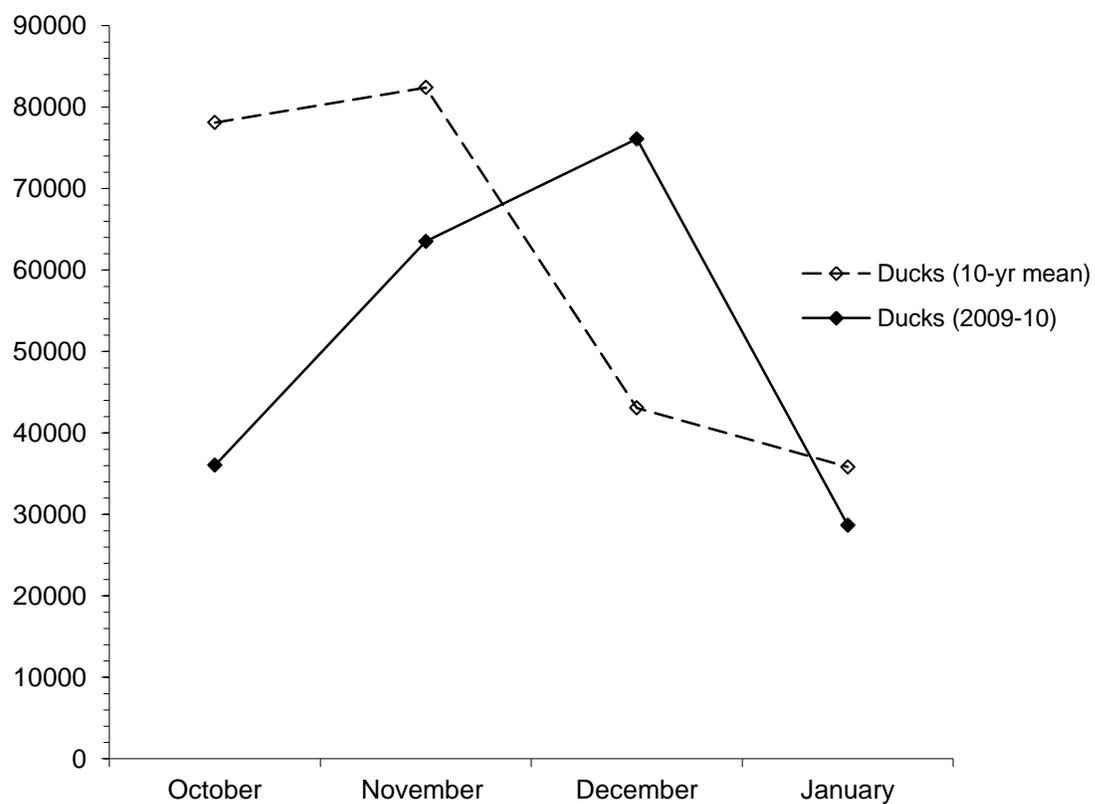


Figure 2. Total number of ducks observed during the 2009-10 survey period compared to the mean number of ducks observed during the previous ten years (1999-2008) in Delaware

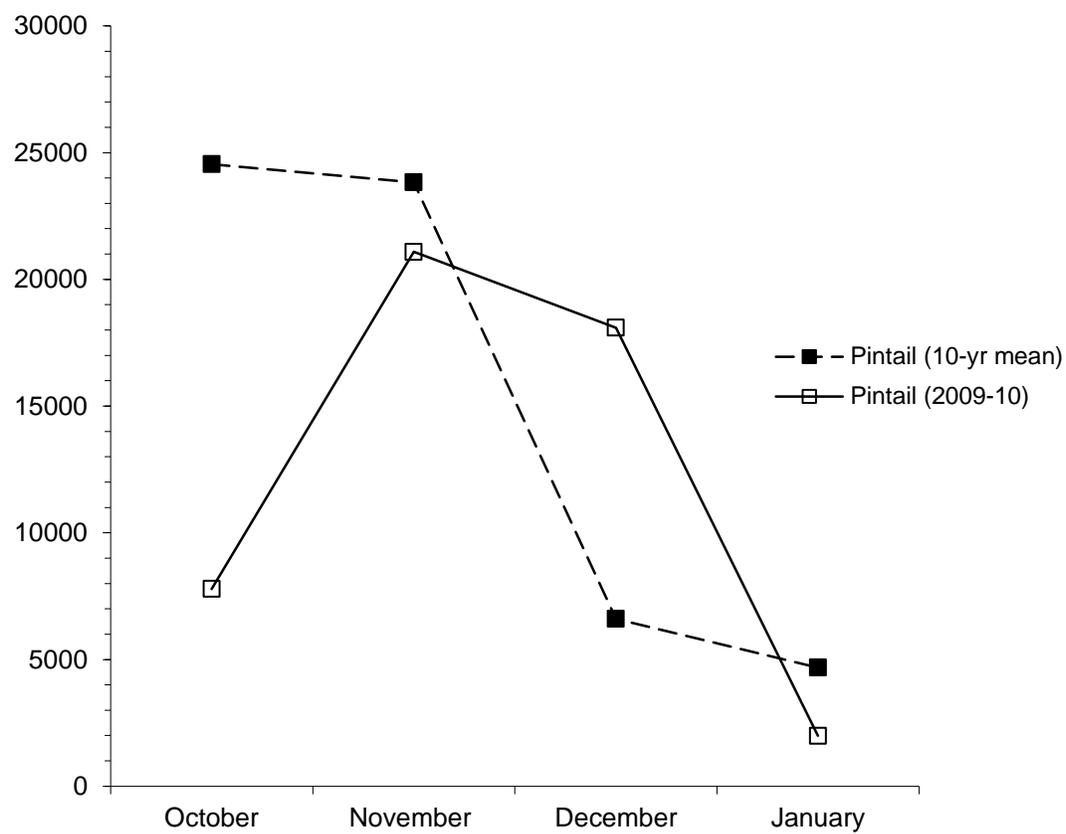


Figure 3. Number of northern pintail observed during the 2009-10 survey period compared to mean number observed during the previous ten years (1999-2008) in Delaware.

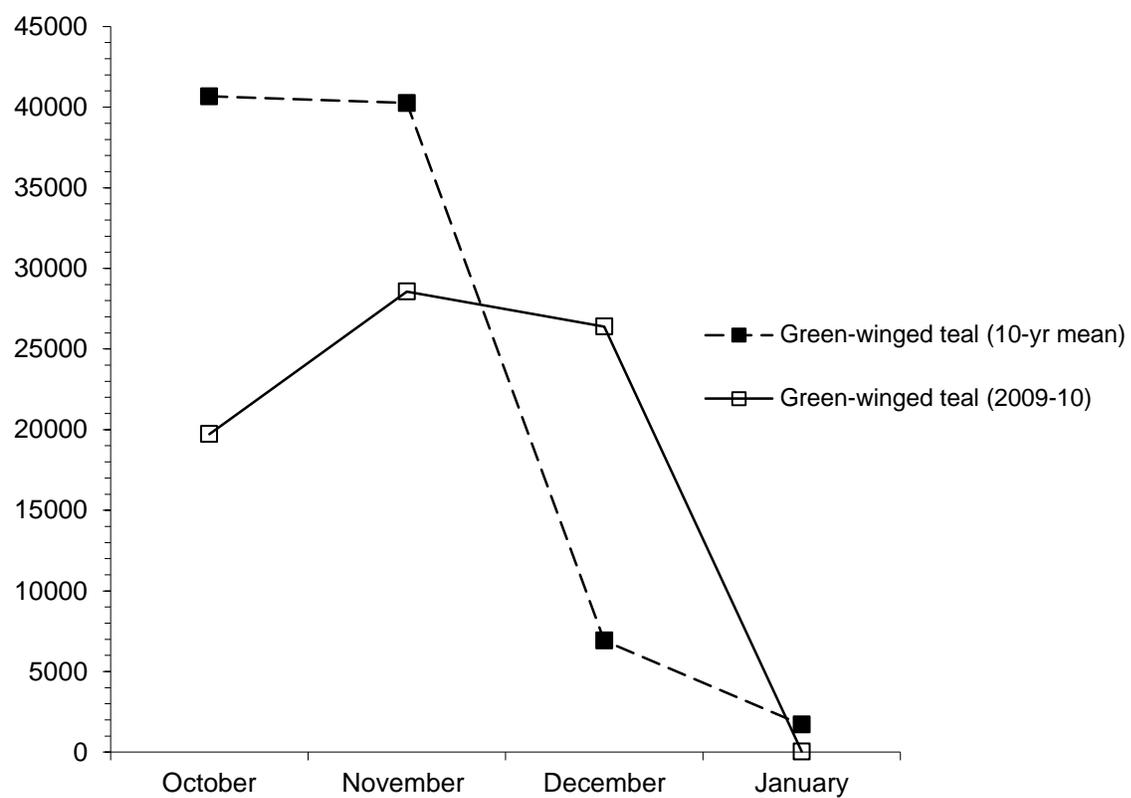


Figure 4. Number of American green-winged teal observed during the 2009-10 survey period compared to mean number observed during the previous ten years (1999-2008) in Delaware.

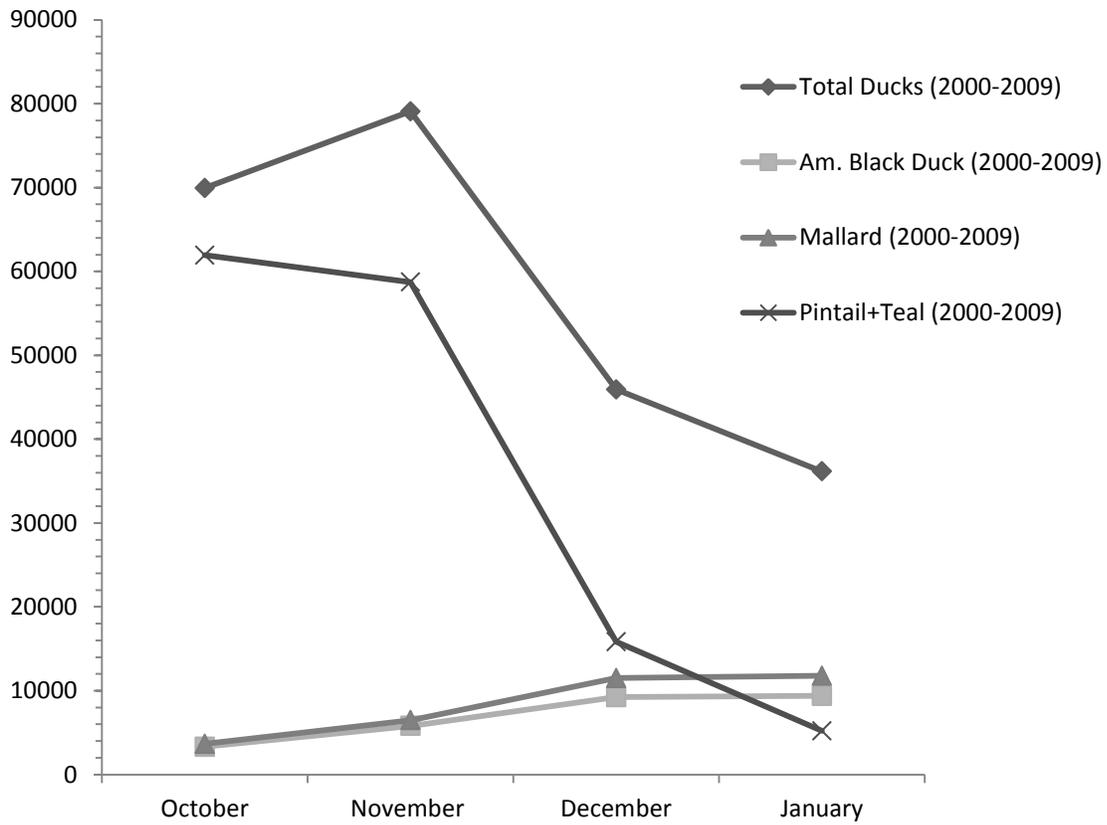


Figure 5. Short-term (2000-2009) trend data for the most abundant duck species observed in Delaware, as well as, the total number of ducks counted during each monthly survey.

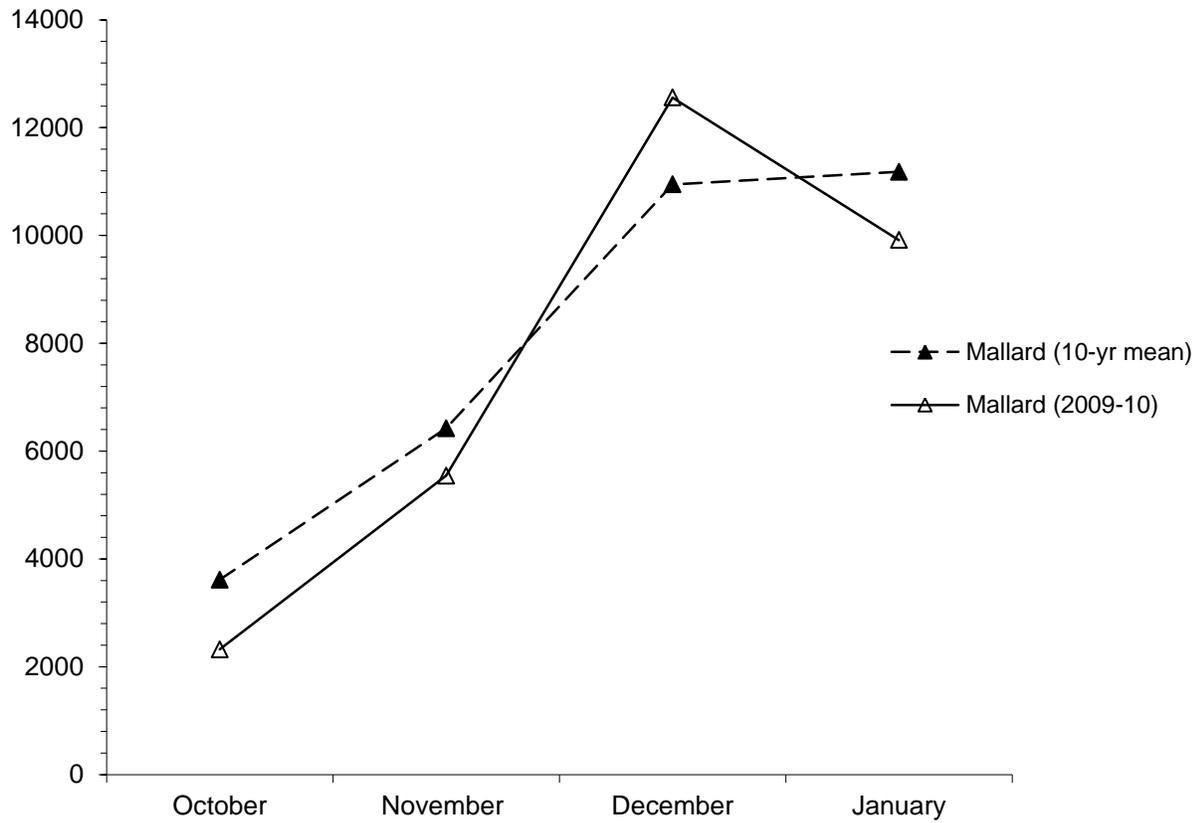


Figure 6. Number of mallards observed during the 2009-10 survey period compared to mean number observed during the previous ten years (1999-2008) in Delaware.

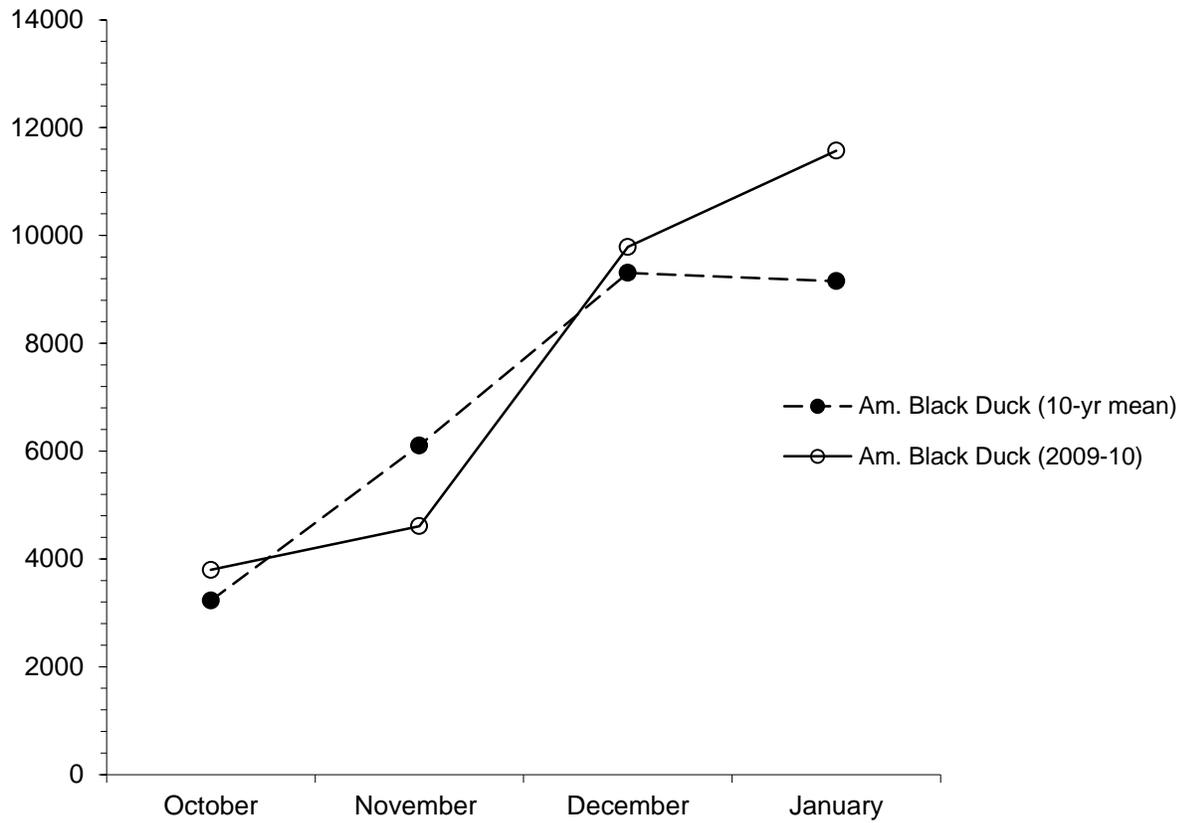


Figure 7. Number of American black ducks observed during the 2009-10 survey period compared to mean number observed during the previous ten years (1999-2008) in Delaware.

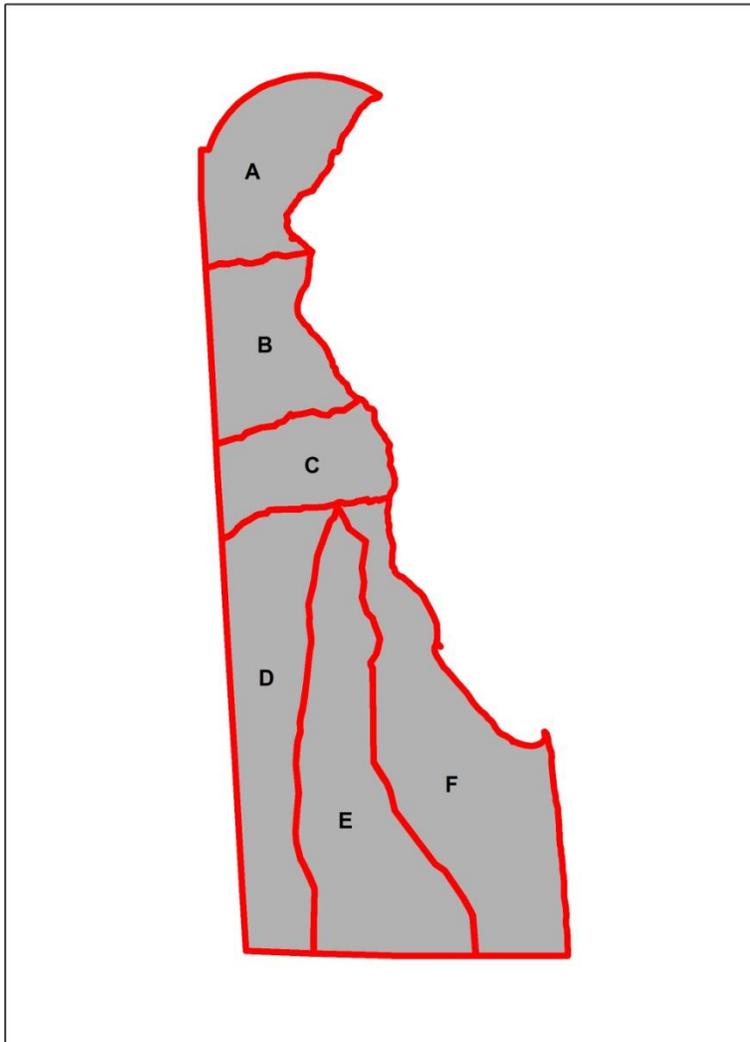


Figure 8. Canada Goose Survey Zones

- A. New Castle Co. North of the C&D Canal.
- B. New Castle Co. from the C&D Canal south to Smyrna.
- C. Kent Co. From Smyrna south to Dover.
- D. Kent and Sussex Co. south of Dover and west of Rt. 13.
- E. Kent and Sussex Co. south of Dover between Rt. 13 and Rt. 113.
- F. Kent and Sussex Co. south of Dover and east of Rt. 113

Table 7. The estimated resident Canada goose population in Delaware (2000-2009) with estimates of the Special September Canada goose season harvests and overall goose harvests during the same period.

UNIT	2000 ^{a,b}	2001 ^c	2002	2003 ^d	2004	2005 ^e	2006	2007	2008 ^g	2009	2010
A	971 (2233) ^f	873 (1746)	507 (1014)	499 (998)	423 (846)	883 (1766)	817 (1634)	403 (806)	309 (618)	364 (728)	192 (384)
B	294 (676)	394 (788)	465 (930)	435 (870)	575 (1150)	264 (528)	445 (890)	528 (1056)	601 (1202)	1951 (3902)	965 (1930)
C	369 (849)	384 (768)	610 (1220)	483 (966)	773 (1546)	368 (736)	501 (1002)	285 (570)	546 (1092)	645 (1290)	281 (562)
D	116 (267)	442 (884)	846 (1692)	675 (1350)	378 (756)	618 (1236)	603 (1206)	582 (1164)	432 (864)	612 (1224)	755 (1510)
E	208 (478)	711 (1422)	1020 (2040)	732 (1474)	478 (956)	549 (1098)	978 (1956)	525 (1050)	864 (1728)	814 (1628)	1293 (2586)
F	481 (1106)	1404 (2808)	1227 (2454)	1143 (2286)	1254 (2308)	1831 (3662)	1620 (3240)	1480 (2960)	2093 (4186)	2902 (5804)	1954 (3908)
Total	2434 (5610)	4202 (8416)	4675 (9350)	3967 (7934)	3881 (7762)	4513 (9026)	4964 (9928)	3803 (7606)	4845 (9690)	7288 (14576)	5440 (10880)
%Δ		50%	11%	-15%	-2%	16%	10%	-23%	34%	50%	-34%
Harvest (Sep)	700	5,900	6,300	2,900	3,300	2,000	1,100	2,100	2,200	1,400	
Harvest (All)	700	14,800	21,600	11,700	14,000	19,000	12,800	21,996	28,637	24,900	

^a Corrected totals were expanded by 15% to reflect a 15% annual growth rate as identified in the Atlantic Flyway Resident goose management plan (2000 data only).

^b Regular Canada goose season closed

^c Regular Canada goose season reopened

^d Daily bag limit on Special September Canada goose season increased from 5 to 8 geese/day

^e Daily bag limit on Special September Canada goose season increased from 8 to 15 geese/day

^f Observed goose estimates were expanded by 2X to correct for lack of visibility due to vegetative cover.

^g Special September Canada goose season extended an additional 10 days from Sept 1-15 to Sept. 1-25.

STATE: DELAWARE**GRANT NUMBER AND TITLE:**

W-37R - Wildlife Investigations - Waterfowl

OBJECTIVE:

To maintain waterfowl populations at sustainable and socially acceptable levels while maximizing recreational use of the resource.

JOB NUMBER AND TITLE:

Job 2. Waterfowl Population Breeding Index

JOB OBJECTIVE:

To derive a breeding pair index for nesting waterfowl in Delaware that can be combined with other Atlantic Flyway states to develop an estimate of Atlantic Flyway duck populations. This is being done in cooperation with the Atlantic Flyway Council.

ACTIVITY:

Twenty-nine randomly selected 1 km² plots were checked for waterfowl pairs between April 28 and May 3, 2010. Data for Canada geese, black ducks, mallards, wood ducks and other species were recorded and sent to the project coordinator at Patuxent Wildlife Research Center in Laurel, Maryland for inclusion in the annual Flyway report.

TARGET DATE:

September 30, 2010

STATUS:

On schedule – pre approved extension.

REMARKS:

Aerial inventories were flown on April 19 and April 20 and ground searches of plots were completed on May 1 and 2. Birds observed on the plots included 17 pairs of mallards, 5 pairs of black ducks, 2 pairs of wood ducks, 5 pair of American green-winged teal, 1 pair of gadwall, 1 pair of blue-winged teal, and 17 pairs of Canada geese.

RECOMMENDATIONS:

This job should be continued as it is being done in cooperation with and at the request of the USFWS and the AFCTS.

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