

**PENNSYLVANIA GAME COMMISSION
BUREAU OF WILDLIFE MANAGEMENT
PROJECT ANNUAL JOB REPORT**

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TITLE: Waterfowl Research/Management

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TITLE: Waterfowl Banding

PERIOD COVERED: 1 July 2010 to 30 June 2011

COOPERATING AGENCIES: U.S. Fish & Wildlife Service; U.S. Geological Survey, Biological Resources Division, Bird Banding Laboratory; Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry and Bureau of State Parks

WORK LOCATION(S): Statewide

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ABSTRACT The objective of this project is to band representative samples of wild waterfowl as part of cooperative efforts by state, provincial, and federal agencies in the Atlantic Flyway that provide crucial data for management of the waterfowl resource. During June 2010, 2,790 resident Canada geese (>100% of the state quota) were banded at 45 locations across 21 counties in Pennsylvania. Gosling production was above the 1988 to 2009 averages. The use of multiple goose-banding crews has achieved aggregate banding quotas for all 6 individual physiographic strata for the period 2002 to 2010. During the August-September 2010 pre-season-banding period 3,113 ducks were banded including 2,227 mallards, 776 wood ducks, 31 American black ducks, and 80 individuals of 4 other species (blue-winged teal, green-winged teal, northern pintail, hooded merganser, plus mallard x black duck hybrids). Banding quotas were obtained for mallards and juvenile wood ducks, but not for adult wood ducks or all black duck age and sex cohorts. The proportion of juvenile mallards in the banded sample was below average, while wood duck production was above average in 2010. The second year of Atlantic flyway winter banding initiative for American black ducks was successful in banding 201 black ducks, achieving desired results and indicating that these efforts can increase black duck banding to more effectively monitor population status for this important species. Waterfowl banding should continue during 2011 in support of Atlantic Flyway banding program goals. We will continue efforts to increase the geographic distribution of banding waterfowl across the Commonwealth.

OBJECTIVE

To band representative samples of wild waterfowl as part of cooperative efforts by state, provincial, and federal agencies to achieve banding goals set in the Atlantic Flyway. This provides data (survival and harvest rates, migration timing, distribution and derivation, population changes, and production by local waterfowl) for waterfowl harvest management (e.g., Adaptive Harvest Management), habitat conservation programs (e.g., North American Waterfowl Management Plan), and other aspects for the stewardship of the waterfowl resource at state and flyway levels.

METHODS

During June 2010, resident Canada goose banding was conducted by Pennsylvania Game Commission (PGC) Bureau of Wildlife Management staff, regional personnel, and other volunteers that were organized into banding crews operating in multiple regions (Northwest/Southwest/Northcentral and Southcentral/Northeast/Southeast). The multi-crew approach is used to band a representative number of geese in the 6 physiographic strata (Figure 1) in which banding quotas are set using 1% of the 2008-10 average breeding population estimates within each stratum. Flightless geese (goslings and molting adults) were captured by driving them onto land and surrounding them with a temporary corral of portable panels (Costanzo et al. 1995). Age and sex were determined for each goose using plumage characteristics and cloacal examination, respectively (Hanson 1962). Following determination of sex and age, geese were banded with standard Bird Banding Laboratory (BBL) butt-end aluminum leg bands.

Pre-season (August through September) duck banding was conducted by Bureau of Wildlife Management biologists and biologist aides, regional personnel (biologists, food & cover employees, and wildlife conservation officers), and banding volunteers at 15 sites in Erie, Crawford, Mercer, Dauphin, York, Pike, Susquehanna, Wayne, Berks, and Lancaster counties. Ducks were captured in shallow-water swim-in traps baited with shelled corn. Age and sex of captured ducks were determined primarily from plumage characteristics (Bellrose 1976, Carney 1992), with cloacal examination (Dimmick and Pelton 1994) used to verify sex and age of individuals with questionable plumage. Following determination of sex and age, ducks were banded with standard BBL butt-end aluminum leg bands.

Winter black duck banding was conducted 1 January through 20 March 2011 by Bureau of Wildlife Management staff, regional personnel, and biologist aides. Trapping locations included: (Northwest region) Enterline Farm, Pymatuning Wildlife Management Area, Presque Isle State Park, Erie National Wildlife Refuge-Seneca Unit, (Southcentral region) Haldeman Island, (Southeast region) Middle Creek Wildlife Management Area and Lake Ontelaunee. Black ducks were captured by shallow swim-in traps baited with corn. Sex was determined by presence of mottling on the bill and confirmed by cloacal examination. Black ducks, mallards and hybrids were assigned to either “after second year” (ASY) or “second year” (SY) based on the presence of edging and shape of the primary coverts 5-9, and the shape and wear of the tertial coverts 5 (Ashley et al. 2006). Any ducks captured that were not conclusive were assigned to the age class “after hatch year” (AHY). In addition, a new classification protocol for hybrids was developed for the 2011 season based on wing characteristics and body plumage. Hybrids were categorized as “black duck like” (ABDX), intermediate (MBDX) and “mallard like” (MALX). Although

mallards were not the targeted species, they were also banded during this period except in some instances where large numbers of birds were captured and poor weather conditions existed. Mallards were then released unbanded to reduce mortality, handling time, and hypothermia. Following species code, age, and sex determination, all ducks were banded with standard BBL butt-end aluminum leg bands and released. Following trapping efforts, banding data was compiled using Bandit software (USGS-BRD Bird Banding Laboratory 2011). Electronic files of banding schedules were submitted to the BBL within 4 weeks of the conclusion of field banding efforts.

RESULTS

Canada Goose Banding

The 2,790 new geese banded in 2010 was identical to the number banded in 2009 and down 8% from the 2002-09 average of 3,036 (Tables 1 and 2) reflecting the recent downward trend in Canada goose population estimates statewide. We exceeded the 2010 statewide banding quota of 2,562 by 9%. Individual stratum quotas were met or exceeded in 5 of the 6 strata in 2010. The percentage of each stratum goal achieved ranged from 72% in stratum 243 to 154% in stratum 13. Since 2002 when we began using multiple-crews, aggregate 9-year banding accomplishments have exceeded the aggregate stratum quotas by 1% to 31% and have exceeded the aggregate statewide quota by 17%. The multi-crew approach has greatly improved the distribution of the statewide banding sample than previously achieved using a single banding crew.

Juvenile geese comprised 47% of the banded sample, slightly above the 1988-2009 average proportion of 44%. The number of juveniles per adult female banded (2.09) was 28% above the 1988-2009 average of 1.63. This indicates above average gosling production, and recruitment rates in 2010. This was the highest age ratio observed since 2004.

A total of 335 geese banded in previous years were recaptured during banding operations with 91% of these recaptures occurring in the same 10-minute block of latitude and longitude as the original banding (Table 1). Thirty-one of these recaptures were banded in a different 10-minute block than banded and are considered a foreign recapture. These recapture histories are provided in Table 3.

Pre-season Duck Banding

Pennsylvania's duck banding quotas as outlined in the North American Banding Program Document (U.S. Fish and Wildlife Service [USFWS] 1989) are 1,200 mallards (600 adult, 300 immature male and female each), 750 wood ducks (400 adult, 175 immature male and female each), and 100 black ducks (50 adult, 25 immature male and female each).

Habitat conditions during the pre-season-banding period were generally drier than average for much of Pennsylvania. Low water levels in past years seemed to correlate with increased bandings by concentrating birds.

Bandings occurred in 15 locations statewide with 4 of the 6 PGC Regions participating. The results were down overall from the 1989 to 2009 Long Term Average (LTA). Total ducks

banded was 3,113 down 21% from the LTA (Table 4). Atlantic Flyway banding quotas were met for mallards and juvenile wood ducks, but missed for adult wood ducks (77% attained), and adult and juvenile black ducks (30% and 32% of respective quotas).

As usual, mallards made up the largest species proportion of the total with 2,227 individuals banded (Table 1), down 19% from the LTA. The 2010 mallard juvenile to adult female age ratio of 5.51 was 31% above the average of 4.21. The range for mallard age ratios, since 1989, has been 2.16 to 6.74 juveniles per adult female. Wood duck bandings were down 27% from the LTA with 776 banded this year. The wood duck age ratio of 3.5 juveniles per adult female was 22% below the average of 4.44 (range 2.47 to 6.64). Only 31 American black ducks were banded. This was down 50% from average. The black duck age ratio was 2.3, below the average of 4.47. However, with relatively low number of black duck pre-season bandings, age ratios vary widely (range 1.73 to 30.25). Pre-season black duck bandings continue to fall short of flyway quotas and well below average levels. In 2010, the PGC was again awarded a grant from the Black Duck Joint Venture Northeast States Black Duck Banding Project Fund to maintain banding efforts targeting black ducks in Pennsylvania. However, these efforts were directed towards the winter black duck banding effort described below instead of pre-season efforts in 2010.

From 1989-2009 Pymatuning Wildlife Management Area (WMA) accounted for 74% of the total statewide duck bandings each year. In 2010, the ducks banded at Pymatuning accounted for 66% of the total Pennsylvania duck bandings. Numbers of mallards and especially wood ducks banded at Pymatuning has declined since 2002. Pymatuning remains the top banding location for mallards in the Commonwealth with 77% of the statewide total. Wood duck bandings at Pymatuning accounted for 33% of the state total and reflects the better trapping success in 2010 for this important species. Presque Isle (Erie County) accounted for 12% of the total duck bandings in 2010 and was similar to the LTA for this location. Presque Isle accounted for 13% of state mallard bandings and 9% of state wood duck bandings. A new banding location near Mercer, Mercer County accounted for 13% of statewide wood duck bandings. Middle Creek WMA accounted for approximately 8% of total statewide duck bandings. The Middle Creek total was below the LTA. Middle Creek was the third highest producer of mallards and second in wood duck bandings in the state with 3% and 20% of the totals for each species. Haldeman Island (Dauphin County) accounted for 5% of the statewide banding total in 2010. This was below the LTA for this banding station. Bandings of wood ducks accounted for 17% of the state totals. The 6 Northeast Region banding stations collectively accounted for 3% of all duck bandings and 7% of all wood duck bandings. The number of black ducks banded was 0 for the first time since the current pre-season banding program was initiated in 1989.

Very important, albeit lower numbers of, pre-season ducks were obtained from the remaining 4 banding locations in York and Berks counties. One important component of pre-season duck banding is to mark representative proportions of our statewide waterfowl population as financially and logistically feasible. Therefore, we strive to maintain and increase our efforts where possible throughout the state. This reduces potential bias in estimated population parameters (i.e. survival and harvest rates) that would otherwise occur from banding at relatively few locations. We will continue efforts to add and maintain operational banding stations in PGC regions with relatively few waterfowl bandings compared with the rest of Pennsylvania.

Because dabbling duck species other than mallards, black ducks, and wood ducks breed only in limited numbers in Pennsylvania, bandings of these less common species include a higher percentage of migrants relative to locally breeding or produced birds, and thus tend to be more variable from year to year due to the effects of weather conditions and food availability on migration patterns. An additional 80 individual blue-winged teal, green-winged teal, northern pintail, mallard X black duck hybrid, and hooded merganser were banded in 2010 (Table 5).

Since 1996, the transition to toll-free (TF) bands (inscribed with the toll-free telephone number 1-800-327-BAND, for reporting band recoveries), and now, including a web-address (www.reportband.gov) in addition to the TF inscription, has been highly successful in increasing band-reporting rates. Higher reporting rates, in turn, enhance the cost-effectiveness of banding efforts by increasing the amount of information gained per unit effort expended in banding operations. A necessary drawback to this program has been a period of time during which reporting rates were changing and uncertain, temporarily precluding direct estimation of harvest rates. With the TF inscription now fully implemented, reporting rates are believed to have stabilized; a large-scale reassessment of reporting rates is underway to ensure that harvest rates are being accurately estimated from band returns. The USFWS initiated research on current band reporting rates (i.e., a reward-banding study) for mallards and black ducks in 2002. Wood ducks, some Canada goose populations, and other species were added to the study for 2003-2004 to address the possibility of different reporting rates for species other than mallards. We continued our participation in the federal band reporting rate study to assess reporting rates for recovered bands. This is the 7th consecutive year of our participation in this important study. Reward banding that was conducted in 2010 is to allow for further refinement of harvest and reporting rate estimates for select species and also to examine if bands also inscribed with the web address had different reporting rates or methods than standard bands. In support of this research, 200 adult male mallards banded in Pennsylvania were included in the reporting rate study by marking with specified combinations of reward and standard control bands. Large-scale reward banding for the national reporting rate study is now complete and data analysis is ongoing. Preliminary results suggest that Atlantic Flyway reporting rates are approximately 73% for mallards, wood ducks, and resident Canada geese. There is some evidence that Canadian reporting rates (58%) are lower than the U.S. reporting rates (73%), and may explain why reporting rates for American black duck and migratory Canada geese are lower than the species mentioned previously. These reporting rates compare with approximately 30 to 40 percent before the use of the toll-free/web reporting systems. Again this year, a portion of mallard bands used contained the web address inscription, www.reportband.gov for reporting bands along with the toll-free telephone number (1-800-327-BAND) inscription.

Information on current band reporting rates for various species will be used to help evaluate and, if necessary, revise banding quotas and geographical distribution of banding efforts at flyway and state levels to ensure that resources allocated to banding are addressing current information needs with maximum efficiency. The USFWS is developing an updated North American Banding Needs Document that may guide banding programs in 2012.

Winter Black Duck Banding

Pre-season bandings for black ducks have been consistently falling short of flyway goals.

In 2010, the Black Duck Joint Venture initiated a 5-year pilot study to determine whether it was feasible to band wintering black ducks in the northeastern states. During this time period, wintering populations of black ducks are relatively more concentrated than pre-season. Black duck banding quotas for Pennsylvania, as outlined by the Black Duck Joint Venture are 150 black ducks in the Northwest Region (NW), and 50 black ducks for the remainder of Pennsylvania, although we continued efforts through the end of the banding period (March 20) rather than cease efforts when goals were reached.

A one-day training session was conducted on 20 January 2010 for personnel on proper trapping, identification and banding procedures. Additional training was completed 1-3 August 2010 during a North American Banding Council (NABC) waterfowl banding workshop at Pymatuning WMA. Mr. Norm North (Canadian Wildlife Service, retired) and Jeremy Stempka provided training on identification of mallard x black duck hybrids for workshop participants. Workshop participants received certification as either waterfowl trainers or banders by NABC. Jeremy Stempka and Kevin Jacobs also attended the 2011 Atlantic Flyway wingbee for additional training on hybrid identification and shared with agency staff. Jeremy Stempka also constructed a new trap design in 2010 to increase capture rates, provide trapped ducks additional space to loaf and conserve energy, and for more efficient removal from the trap for identification and banding before release.

The winter of 2011 marked the second year of the 5 year post-season black duck banding study. A total of 201 black ducks were banded (NW-143, Southcentral Region (SC)-1, Southeast Region (SE)-57) (Table 6) exceeding 2010 by 25%. However, banding goals were slightly missed in the NW Region (95% attained) but were exceeded (16% above) for the remaining portion of the state. Of the 201 black ducks banded, 129 were males (64%) and 72 (36%) were females. The proportion of males and females observed in 2011 are similar to 2010 post-season banding (67% males, 33% female). The age ratio of SY to ASY black ducks was 1.27 which is substantially higher than the age ratio observed in 2010 (0.67). We also banded 37 hybrids (20% higher than 2010) including 25 ABDX, 7 MALX and 5 MBDX. We believe the higher percentage of hybrids is due to additional training and classification system; birds that may have previously been classified as mallards were now classified as MALX. Also, a few birds that may have been previously classified as MBDH in prior years, were now classified as ABDU due to the allowance of some "buff or gray" in the greater secondary coverts.

As outlined by the operating protocols for winter banding operations, a continental total >3000 post-season mallards was determined to be adequate to allow statistical assessment of vital rates similar to black ducks. During the 2011 season, 342 mallards were captured and banded in Pennsylvania exceeding 2010 by 46%. Of the 342 mallards banded, 187 were males (55%) and 155 were females (45%). The proportion of males and females differed from 2010 (66% males and 34% females) as a result of banding females over males for more efficient use of band inventories. The age ratios of SY to ASY mallards observed this year (0.95) were similar to age ratios observed in 2010 (0.97). Both mallard and black duck winter age ratios were lower than the observed pre-season age ratios in Pennsylvania (mallard average 2.16 - 6.74, black duck 1.73-30.25). However, since the annual survival of juvenile birds is lower than adults, observed age ratios should decrease as the season progresses. In addition to black ducks, mallards and hybrids, 5 additional species were banded including: American wigeon (5), ring-necked duck (2),

Northern pintail (2), redhead (1) and canvasback (1).

The Enterline Farm in Mercer County accounted for a large proportion of the ducks banded including 33% of black ducks, 31% of mallards and 27% of hybrids. Middle Creek WMA also accounted for a large proportion of birds banded including 28% of black ducks, 28% of mallards, and 32% of hybrids. Presque Isle accounted for 22% of black ducks, 14% of mallards and 22% of hybrids. Pymatuning WMA accounted for 15% of black ducks banded, 18% of mallards and 19% of hybrids. Haldeman Island accounted for <1% of black ducks and 9% of mallards. Banding was also attempted at the Erie National Wildlife Refuge (NWR) in Crawford County. Black ducks (>100) were observed at the location however remote access and heavy snow cover made it difficult to capture birds. After spending a considerable amount of time at the location additional access areas were discovered and will hopefully allow increased success in 2012.

Trapping efforts also produced 42 recaptures including 22 black ducks, 2 ABDX and 18 mallards (Table 7). Thirty-eight black ducks, ABDX and 5 mallards recaptured were banded during the 2010 post-season black duck banding. It is interesting to note that of the 82 black ducks banded at Enterline's farm during winter 2010, 13 (16%) were recaptured in the same location this year. Also, 4 of 8 black duck recaptures at Middle Creek were banded in winter 2010, 2 were banded pre-season at Middle Creek in 2010, while the final 2 were banded pre-season in Quebec; 1 in 2008 and the final in 2010. The remaining mallard recaptures were recovered in different 10 minute blocks than they were banded and are considered foreign recaptures. Of the foreign recaptures, 10 were banded at Pymatuning WMA, 1 was banded in Ontario, 1 was banded in Saskatchewan, and 1 was of unknown origin.

The winter black duck banding will continue through 2014. More favorable weather conditions would certainly make banding effort easier and also allow banders to use alternative capture techniques such as rocket netting.

We held a North American Banding Council waterfowl banding workshop hosted by the PGC at Pymatuning, in August. This workshop was attended by 35 agency personnel and volunteers (5 Wildlife Management Supervisors, Game Management Division Chief, Wildlife Veterinarian, Law Enforcement Supervisor, 7 Wildlife Conservation Officers, 6 Deputy Wildlife Conservation Officers, Land Management Supervisor, 7 Wildlife Biologists, 3 Bio-aides, and 3 PGC volunteers), 1 NABC and 1 BBL instructors. Thirty-two attendees completed the NABC exam including 5 at the trainer level and 27 at the bander level (2 PGC staff were already certified as trainers). Twenty-eight participants received certification as banders or trainers. The 3-day (travel-time included) workshop included field demonstrations at Pymatuning Wildlife Management Area on duck capture, identification and banding techniques as well as classroom PowerPoint presentations on all aspects of waterfowl capture and banding including, BBL procedures and considerations, pre- and post-season banding for swans, Canada goose, dabbling ducks, diving ducks, mourning doves, woodcock, mallard/black duck hybrid identification, animal welfare and disease issues. Compilation of course evaluations and material from the workshop were distributed to PGC staff participating with the waterfowl banding program.

The BBL has proposed a revision of banding rules to clarify the permitting of banders

and add the new classification of assistant banders. This classification will replace the use of a banding authorization letter for banding of waterfowl and mourning doves using bait-trap techniques. In anticipation of this change, we have added all current banders onto the PGC permit as sub-permittee banders with authorizations provided as required by each individual sub-permittee. The PGC Station Banding Permit was also revised by the BBL to August 2012.

RECOMMENDATIONS

1. Continue waterfowl banding efforts during Fiscal Year 2011 in support of the Atlantic Flyway cooperative banding program. Continue efforts to distribute Canada goose bandings proportionally in each physiographic stratum, to increase the number of black ducks banded, and to improve the geographic distribution of mallard and wood duck bandings.
2. Participate as needed with the BBL, USFWS and Atlantic Flyway Migratory Game Bird Technical Section band reporting rate studies, reassessment of banding needs, and other banding related activities affecting populations of waterfowl important to Pennsylvania.
3. Continue using Bandit software with updates to manage banding database. Train agency-banding staff on electronic entry and submission of banding data for the 2011 field season.
4. Acquire and distribute bands and equipment to field biologists for 2011 pre-season banding program by June 2011.
5. Conduct post-season winter duck banding in support of the pilot black duck banding study and seek financial support from the Northeast U.S. Black Duck Joint Venture grant.

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Table 1. Numbers of resident Canada geese, by age and sex category, banded in Pennsylvania during 2010, plus recaptures of previously banded geese.

Location name or nearest town	Code	Adult		Juvenile		New	Recaptures			Total
		Male	Female	Male	Female	Total	Local	Foreign	Total	
Strata 10										
Cashtown	ADAM02	0	0	15	18	33	4	0	4	37
Fairfield	ADAOWL2	12	2	7	10	31	0	0	0	31
Middle Creek WMA	LANC01	16	22	33	36	107	5	1	6	113
Muddy Run	LANC03	45	50	0	0	95	8	0	8	103
Mount Joy	LANC04	25	38	19	30	112	11	0	11	123
Marburg	YORK01	46	38	30	40	154	26	0	26	180
Long Arm Dam	YORK04	29	33	21	32	115	6	0	6	121
Lehigh University	NORT05	25	19	6	6	56	29	0	29	85
East Banger	NORT01	4	1	10	15	30	9	0	9	39
Totals		202	203	141	187	733	98	1	99	832
Strata 13										
PPL Montour Preserve	MNTR02	6	6	5	5	22	4	1	5	27
Sunbury	NOUM01	52	58	39	58	207	19	0	19	226
Susquehanna River Cliff	NOUFAL01	3	0	0	0	3	0	0	0	3
Selinsgrove	SNYD02	11	14	13	17	55	9	0	9	64
Middleburg	SNYD03	5	6	12	16	39	1	0	1	40
Haldeman Island	DAUP01	5	10	12	18	45	0	0	0	45
Letterkenny	FRAN01	1	6	2	6	15	2	0	2	17
Scotland	FRAN03	11	13	18	26	68	0	1	1	69
New Franklin	FRADOV03	23	31	15	22	91	0	0	0	91
Totals		117	144	116	168	545	35	2	37	582
Strata 22										
Cross Creek County Park	WASH01	11	17	16	22	66	7	1	8	74
Cherry Valley Lake	WASH07	4	4	11	13	32	3	0	3	35
Near Wooddale	FAYE02	10	5	13	5	33	0	0	0	33
Mammoth Lake	WEST03	6	5	14	13	38	1	3	4	42
Near Mt. Pleasant	WEST07	12	13	10	13	48	0	4	4	52
Indian Lake	WEST09	16	13	14	10	53	0	0	0	53
Monessen	WEST10	25	23	14	12	74	0	0	0	74
Totals		84	80	92	88	344	11	8	19	363

Table 1. Cont.

Location name or nearest town	Code	Adult		Juvenile		New Total	Recaptures			Total
		Male	Female	Male	Female		Local	Foreign	Total	
Strata 241										
Pymatuning Wildlife Management Area	CRAW01	99	94	50	51	294	92	8	100	394
Near Saegertown	CRAW06	31	9	26	35	101	2	1	3	104
Tamarack	CRAW07	8	10	10	11	39	1	0	1	40
Near West Middlesex	MERC02	13	9	30	34	86	9	0	9	95
Totals		151	122	116	131	520	104	9	113	633
Strata 242										
Farmers Valley	MCKE01	16	13	28	30	87	7	2	9	96
Mt Jewett	MCKE02	2	2	6	7	17	0	0	0	17
Port Allegheny	MCKE03	5	4	11	9	29	0	0	0	29
Roulette	POTT01	12	10	9	17	48	2	0	2	50
Coudersport	POTT03	17	11	16	16	60	11	1	12	72
Galeton	POTTR01	6	2	3	3	14	3	0	3	17
Hills Creek State Park	TIOG04	8	6	11	14	39	6	0	6	45
Allegheny River near Starbrick	WARR01	2	0	8	5	15	1	0	1	16
Warren	WARR02	25	26	4	8	63	1	0	1	64
Chapman Dam	WARR03	3	3	5	6	17	0	2	2	19
Donegal Lake	WEST08	17	19	2	1	39	15	3	18	57
Totals		113	96	103	116	428	46	8	54	482
Strata 243										
Towanda	BRAD01	3	5	13	15	36	3	0	3	39
Orwell	BRAD05	3	2	5	8	18	1	0	1	19
Wyalusing	BRAD08	7	2	9	11	29	0	2	2	31
Dalton	LACKA02	18	16	31	46	111	5	1	6	117
Near Tunkhannock	WYOM04	8	5	7	6	26	1	0	1	27
Totals		39	30	65	86	220	10	3	13	233
Grand Total		706	675	633	776	2790	304	31	335	3125

Table 2. 2010 Canada goose bandings and recaptures by PGC region and county.

Region	County	Total New Bandings	Total Recaptures
NW	Crawford	434	104
	Mercer	86	9
	Warren	95	4
	NW Region Total	615	117
SW	Westmoreland	252	26
	Fayette	33	0
	Washington	98	11
	SW Region Total	383	37
NC	McKean	133	9
	Potter	122	17
	Tioga	39	6
	NC Region Total	294	32
SC	Adams	64	4
	Franklin	174	3
	Snyder	94	10
	SC Region Total	332	17
NE	Bradford	83	6
	Lackawanna	111	6
	Montour	22	5
	Wyoming	26	1
	Northumberland	210	19
	NE Region Total	452	37
SE	Dauphin	45	0
	Lancaster	314	25
	Northampton	86	38
	York	269	32
	SE Region Total	714	95

Table 3. Banding histories of Canada geese recaptured during 2010 banding and previously banded in another location.

Recapture Location	Original Banding Location	Banding Date	Number of Birds
Pymatuning WMA	Ohio	Unknown	5
Pymatuning WMA	President, Venango Co.	2009	1
Pymatuning WMA	Beaver Run Reservoir Westmoreland Co.	2009	1
Pymatuning WMA	Oklahoma	Unknown	1
Woodcock Creek Lake	Pymatuning WMA	2004	1
Farmers Valley	New York	Unknown	1
Farmers Valley	Buzzard Swamp	2009	1
Coudersport	Roulette	2007	1
Chapman Dam	Warren	2001	1
Chapman Dam	Unknown	Unknown	1
Wyalusing	New Albany	2004	2
Dalton	Wynooska Lake	2005	1
Middle Creek WMA	New York	Unknown	1
Montour Preserve	Lewisburg	2008	1
Scotland	Quebec	Unknown	1
Cross Creek County Park	Cherry Valley Lake	2007	1
Mammoth	Ethel Springs Lake	2009	2
Mammoth	Ethel Springs Lake	2006	1
Mt. Pleasant	Wooddale, Fayette Co.	2007	4
Donegal	Ethel Springs Lake	2009	2
Donegal	Pioneer Park Campground	2008	1

Table 4. Numbers of mallards, wood ducks and American black ducks banded in Pennsylvania during the 2010 pre-season banding period.

Banding Location	Mallard					Wood Duck					Black Duck					Comb Total
	AM	AF	JM	JF	Total	AM	AF	JM	JF	Total	AM	AF	JM	JF	Total	
<u>NW Region</u>																
Pymatuning WMA	291	183	677	569	1,720	83	28	94	54	259	4	7	10	3	24	2,003
Presque Isle	58	8	139	74	279	22	3	30	11	66	1	0	2	0	3	348
Mercer	0	0	0	0	0	29	25	23	22	99	0	0	0	0	0	99
<u>SC Region</u>																
Haldeman Island	7	6	2	7	22	5	25	55	47	132	1	0	0	0	1	155
Sheppard-Myers Reservoir	0	0	7	3	10	0	0	0	0	0	0	0	0	0	0	10
Hokes Mills – York Co.	5	2	38	18	63	0	0	0	0	0	0	0	0	0	0	63
Lake Marburg	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
<u>NE Region</u>																
SGL 91 near Bear Creek	0	0	1	1	2	2	2	1	0	5	0	0	0	0	0	7
Shohola Lake, SGL 180	0	5	17	24	46	3	4	15	6	28	0	0	0	0	0	74
Pecks Pond	0	0	1	2	3	0	0	0	1	1	0	0	0	0	0	4
Decker Pond, SGL 183	0	0	0	0	0	2	2	2	0	6	0	0	0	0	0	6
Wayne Co.	0	0	0	0	0	1	4	2	3	10	0	0	0	0	0	10
Stillwater Lake, Susq. Co.	0	0	0	0	0	2	2	2	0	6	0	0	0	0	0	6
<u>SE Region</u>																
Middle Creek WMA	13	32	24	7	76	22	38	56	41	157	2	0	1	0	3	236
Lake Ontelaunee	1	1	2	2	6	2	1	2	1	6	0	0	0	0	0	12
<u>Statewide Total</u>																
PA quota ^b	375	237	908	707	2,227	173	134	282	187	776	8	7	13	3	31	3,034
	600 ad.		300	300	1,200	400 ad.		175	175	750	50 ad.		25	25	100	

^a AM = adult male, AF = adult female, JM = juvenile male, JF = juvenile female.^b Set by Atlantic Flyway banding needs document.

Table 5. Numbers of other ducks banded in Pennsylvania during the 2010 pre-season banding period.

Banding Location	Species					Total
	Blue-winged teal	American Green-winged teal	Northern pintail	Hooded merganser	Mallard X black duck hybrid	
NW Region						
Pymatuning WMA	40	13	2	2	5	62
Presque Isle	8	4	0	0	4	16
SC Region						
Haldeman's Island	1	0	0	0	0	1
NE Region						
SGL 183 Decker	0	0	0	0	1	1
Statewide Total	49	17	2	2	10	80

Table 6. Number of ducks banded in Pennsylvania during the 2011 winter black duck banding.

Banding Location	Black Duck ABDU							Black Duck Like Hybrid ABDX							Mallard MALL						
	ASY M ^a	ASY F	SY M	SY F	AHY M	AHY F	Total	ASY M	ASY F	SY M	SY F	AHY M	AHY F	Total	ASY M	ASY F	SY M	SY F	AHY M	AHY F	Total
NW Region																					
Enterline Farm	25	12	16	14	0	0	67	5	1	1	1	0	0	8	33	20	33	19	0	0	105
Pymatuning WMA	15	3	6	7	0	0	31	2	0	0	0	0	0	2	10	17	10	26	0	0	63
PI State Park	12	4	19	10	0	0	45	4	0	1	0	0	0	5	9	12	13	14	0	0	48
SC Region																					
Haldeman Island	0	0	0	1	0	0	1	0	0	0	0	0	0	0	18	13	0	0	0	0	31
SE Region																					
Middle Creek WMA	14	3	22	17	1	0	57	3	1	3	3	0	0	10	28	11	33	19	0	4	95
Total	66	22	63	49	1	0	201	14	2	5	4	0	0	25	98	73	89	78	0	4	342

^a ASYM = after second year male, ASYF = after second year female, SYM = second year male, SYF = second year female, AHYM = after hatch year male, AHYF = after hatch year female.

Table 6. Cont.

Banding Location	Intermediate MBDX							Mallard like Hybrid MALX						
	ASYM ^a	ASYF	SYM	SYF	AHYM	AHYF	Total	ASYM	ASYF	SYM	SYF	AHYM	AHYF	Total
NW Region														
Enterline Farm	0	1	0	0	0	0	1	0	1	0	0	0	0	1
Pymatuning WMA	1	0	2	0	0	0	3	2	0	0	0	0	0	2
PI State Park	0	0	0	0	0	0	0	1	0	1	1	0	0	3
SC Region														
Haldeman Island	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE Region														
Middle Creek WMA	1	0	0	0	0	0	1	0	1	0	0	0	0	1
Total	2	1	2	0	0	0	5	3	2	1	1	0	0	7

^a ASYM = after second year male, ASYF = after second year female, SYM = second year male, SYF = second year female, AHYM = after hatch year male, AHYF = after hatch year female.

Table 7: Banding histories of ducks recaptured during 2011 post-season black duck banding.

Species	Sex	Recapture Location	Banding Location	Banding Date
Black Duck	F	Enterline Farm	Enterline Farm	2/27/10
Black Duck	F	Enterline Farm	Enterline Farm	2/27/10
Black Duck	M	Enterline Farm	Enterline Farm	2/27/10
Black Duck	M	Enterline Farm	Enterline Farm	3/3/10
Black Duck	M	Enterline Farm	Enterline Farm	3/3/10
Black Duck	F	Enterline Farm	Enterline Farm	3/4/10
Black Duck	F	Enterline Farm	Enterline Farm	3/4/10
Black Duck	F	Enterline Farm	Enterline Farm	3/5/10
Black Duck	M	Enterline Farm	Enterline Farm	3/6/10
Black Duck	M	Enterline Farm	Enterline Farm	3/6/10
Black Duck	M	Enterline Farm	Enterline Farm	3/7/10
Black Duck	M	Enterline Farm	Enterline Farm	3/7/10
Black Duck	M	Enterline Farm	Enterline Farm	3/7/10
Black Duck		Middle Creek	Middle Creek	3/4/10
Black Duck		Middle Creek	Middle Creek	3/4/10
Black Duck		Middle Creek	Middle Creek	3/5/10
Black Duck		Middle Creek	Middle Creek	3/9/10
Black Duck		Middle Creek	Middle Creek	9/7/10
Black Duck		Middle Creek	Middle Creek	9/9/10
Black Duck		Middle Creek	Quebec	8/22/08
Black Duck		Middle Creek	Quebec	8/24/10
Black Duck hybrid	M	Enterline Farm	Enterline Farm	3/4/10
Black Duck hybrid	M	Enterline Farm	Enterline Farm	3/8/10
Mallard	M	Enterline Farm	Enterline Farm	3/4/10
Mallard	M	Enterline Farm	Enterline Farm	3/5/10
Mallard	M	Enterline Farm	Enterline Farm	3/5/10
Mallard	M	Enterline Farm	Enterline Farm	3/6/10
Mallard	F	Enterline Farm	Enterline Farm	3/7/10
Mallard	F	Enterline Farm	Ontario	2004
Mallard	M	Enterline Farm	Pymatuning	9/5/00
Mallard	F	Enterline Farm	Pymatuning	9/7/05
Mallard	F	Enterline Farm	Pymatuning	8/19/06
Mallard	M	Enterline Farm	Pymatuning	9/14/06
Mallard	F	Enterline Farm	Pymatuning	8/19/07
Mallard	M	Enterline Farm	Pymatuning	9/5/08
Mallard	F	Enterline Farm	Pymatuning	9/1/09
Mallard	M	Enterline Farm	Pymatuning	8/2/10
Mallard	F	Enterline Farm	Pymatuning	8/17/10
Mallard	M	Enterline Farm	Pymatuning	8/17/10
Mallard	M	Enterline Farm	Saskatchewan	6/30/05
Mallard	F	Enterline Farm	UNKNOWN	UNKNOWN
Mallard	M	Presque Isle	Presque Isle	3/23/10

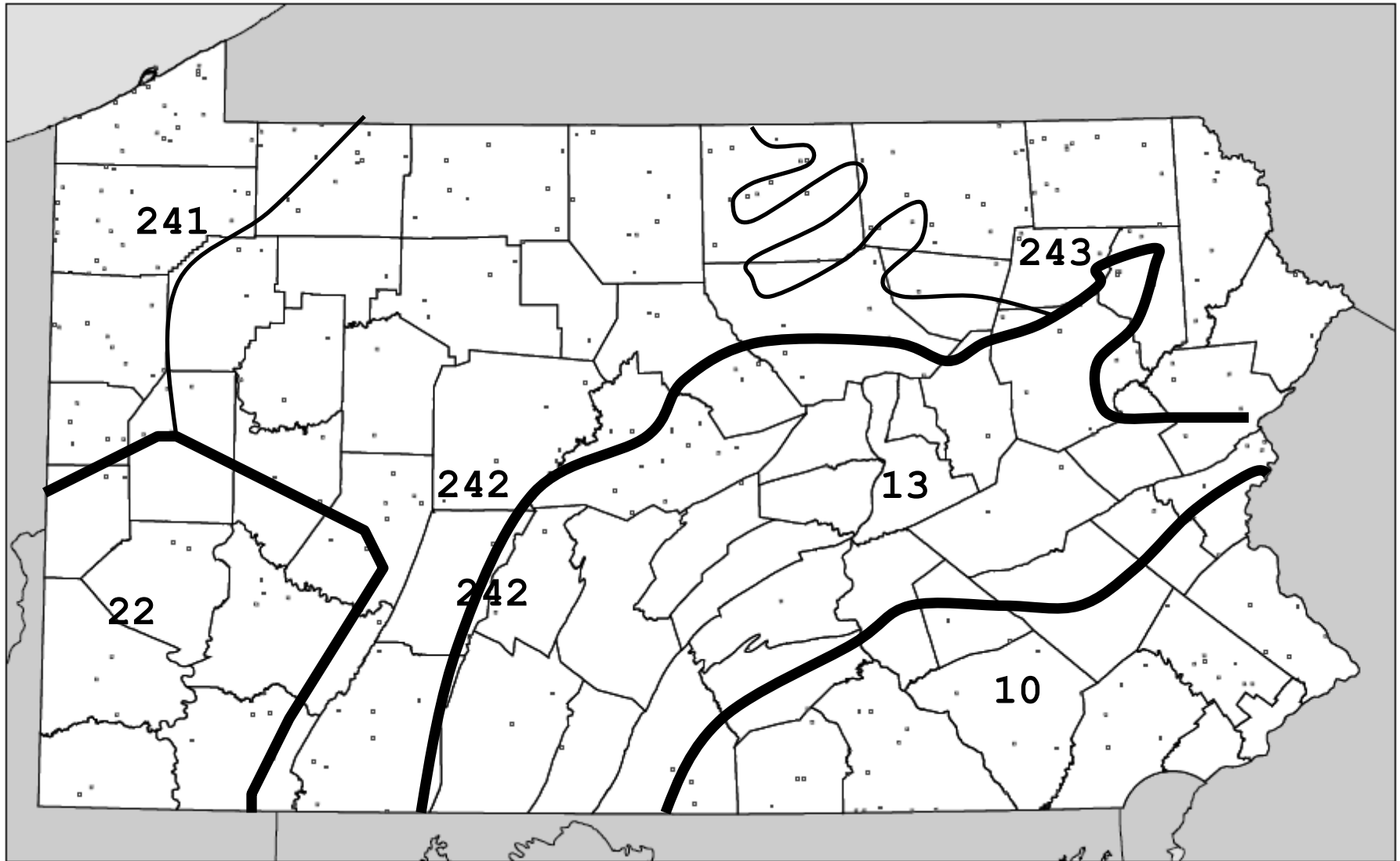


Figure 1. Location of Atlantic Flyway breeding waterfowl survey plots within major physiographic provinces in Pennsylvania. Physiographic Provinces are Piedmont (10), Ridge and Valley (13), Pittsburgh Plateau (22), Glaciated NW (241), Allegheny Mountain/Plateau (242), and Pocono/Low Plateau (243).