

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

PROJECT CODE NO.: 06711

TITLE: Bald Eagle Research/Management

JOB CODE NO.: 71101

TITLE: Bald Eagle Breeding and Wintering Surveys

PERIOD COVERED: 1 July 2015 to 30 June 2016

COOPERATING AGENCIES AND ORGANIZATIONS: U.S. Department of the Interior, U.S. Fish and Wildlife Service; U.S. Army Corps of Engineers; Delaware Water Gap National Recreation Area; U.S. Department of Agriculture, Allegheny National Forest; the Eagle Institute; Audubon Pennsylvania staff and volunteers; Department of Conservation and Natural Resources; Pennsylvania Fish and Boat Commission; New Jersey Fish, Game & Wildlife; New York Department of Environmental Conservation; Hawk Mountain Sanctuary Association; Hawk Migration Association of North America; HawkWatch International, Bird Studies Canada; Raptor Population Index project; members of Pennsylvania Society for Ornithology and Delaware Valley Ornithological Club.

WORK LOCATION(S): Statewide

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ABSTRACT The bald eagle was removed from Pennsylvania's list of endangered and threatened species in 2014. This study continues to monitor nesting and wintering bald eagles in Pennsylvania. Active breeding territories were identified and a sample monitored to estimate nesting success and productivity. The nesting population has grown to the point where a census is not possible, but 304 nesting pairs were reported for the 2015 breeding season, while the number of nesting pairs is believed to be even larger. Of the 72 of the 102 nests in the productivity sample with known outcomes, 82 percent of nests were successful and produced 1.3 fledglings per nest. Wintering eagles were tracked using the nationally standardized Mid-winter Bald Eagle Survey; 256 eagles were found during 2015 surveys in 36 counties and 255 during 2016 surveys in 40 counties. Strategies identified in The Bald Eagle Management Plan for Pennsylvania (2010–2019) were implemented for improving and enhancing public understanding, appreciation and viewing of bald eagles. During 2015, eagle related pages on the Game Commission's web site were viewed over 11.6 million times. The camera feed on a Pennsylvania bald eagle nest was enthusiastically received with over 11.5 million unique viewers. This educational outreach was very successful for the agency's relationship with the public that embraces bald eagles.

OBJECTIVES

1. Assess population status of nesting and wintering bald eagle populations in Pennsylvania through annual inventory and monitoring to assure continued recovery during post-delisting period
2. Improve and enhance public understanding, appreciation and viewing of bald eagles, by implement strategies of the bald eagle management plan.

METHODS

Breeding Season

Bald eagle nests were identified and monitored for nesting activity during the 2015 breeding season by a variety of local observers, including Wildlife Conservation Officers, regional biologists, other agency staff, and volunteers. A randomly selected sample of territories active in 2014 was monitored more intensively than the population as a whole to determine nesting success and productivity. Behavioral observations were used to estimate incubation, hatch and fledging. Nesting productivity was estimated as the number of young observed in the nest just prior to fledging or fledglings seen in the immediate area. New nests are considered new territories when greater than 1 mile from an established nest. Within a mile, a new nest is considered an additional nest in the original territory, unless both nests are active at the same time. Alternate nests, within an established territory, are identified with the original site name plus a sequential number added to distinguish the nest within the territory. The Pennsylvania Game Commission provides nest data to the U.S. Fish and Wildlife Service for new active bald eagle nests because that agency now has the lead in protecting this species.

Nests from the productivity sample with unknown fates were not assigned an outcome. To determine if the population metrics specified in the bald eagle management plan were met, nesting success and productivity were calculated in 2 manners: assuming all nests with unknown fates either succeeded or failed, thereby providing a maximum and minimum value for the population.

Winter Season

The national Mid-winter Bald Eagle Survey (MWBES) overseen by the U.S. Army Corps of Engineers (USACE) was used to monitor wintering eagles. The preferred 2015 dates to run surveys were 9 and 10 January in 2015 and 8 and 9 January in 2016. All eagles seen during surveys were counted. Counts for the federal survey routes were submitted for national tabulation.

Education and Recreation

Documents on bald eagles hosted on the Game Commission's website include specific information on identification, natural history, nesting biology, the history of bald eagle recovery in Pennsylvania, bald eagle nest etiquette, and finding bald eagles. The target audience for these pages is educators, students and adults interested in wildlife and conservation. These various outreach efforts enable the agency to better engage the public in nest monitoring and bald eagle protection, increasing our effectiveness. Engaging the public in bald eagle monitoring and protection was specifically listed as Goal 4 in the Bald Eagle Management Plan for Pennsylvania. (2010–2019), as “improve and enhance public understanding, appreciation and viewing of bald

eagles. The agency specifically engages the public in monitoring and protecting bald eagle nests. The educational products have set the stage for more direct engagement by public.

A bald eagle nest camera provided the public an unprecedented look inside a Pennsylvania bald eagle nest. The area was closed and signs posted to encourage observations without disturbing the nest. The selection of a centrally located Pennsylvania nest was a factor in the popularity of the nest and the camera feed of the nest. This project not only fulfills a strategy of the bald eagle management plan but also the agency's interest in engaging the public with wildlife.

RESULTS

Breeding Season

During the 2015 nesting season, at least 156 volunteers and staff members contributed observations to monitor bald eagles. The nesting population has grown to the point where the statewide count of nests is not possible, but 304 nesting pairs were reported for the 2015 breeding season, while the number of nesting pairs is believed to be even larger. Of the 72 of the 102 nests in the productivity sample with known outcomes, 82 percent of nests were successful and produced 1.3 fledglings per nest. The most conservative estimate, assuming that all nests with unknown results failed, is 57.8% almost reaching the 60% goal for delisting (Table 1, Gross and Brauning 2011, U.S. Fish and Wildlife Service 2009). During the 2015 nesting season, 156 volunteers and staff members contributed observations to monitor bald eagles. All 22 new nests were reported to the U.S. Fish and Wildlife Service since that agency has the lead for protection of bald eagle nests.

Bald eagles were reported nesting in 60 Pennsylvania counties, and 3 counties added multiple nesting territories (Fig. 1). The counties with the most nests, Crawford, Lancaster, York, Erie, Pike, Lycoming and Warren, represent centers of the state's eagle populations; Northwestern wetlands, Upper Delaware River Watershed, and Lower Susquehanna River (Leberman 1992). In some cases, new eagle pairs did not appear to incubate eggs. Eagles can take a breeding season to develop a pair bond. It can be difficult to tell if pairs move from bonding and nest building to incubation, especially if incubation is interrupted by bad weather or human activities.

Breeding activity was observed in areas where nests were not reported, some producing young, suggesting the presence of unidentified nests. Established pairs have territory fidelity, but often have multiple nest sites within a territory. In some cases, an alternative nest is more difficult to see and escapes direct observations. Anecdotal reports suggest that estimates of both nest number and success rate are conservative. In some cases where a new nest is found, it is later reported that the nest had been established for a year or more before its official inclusion. Some changes are artificial, the result of eagles not respecting political boundaries and moving from one side of a body of water to the other, hence changing county or state. New nesting territories usually were established near concentrations of active nests. Bald eagles are still expanding into various parts of the state and new watersheds.

Increasing numbers of eagles nesting in the urban landscape where there are few secluded areas with appropriate habitat will increase eagle-human conflicts. As a result, bald eagle take permits have been granted and occasionally will be needed. The return of eagles to this landscape

is a sign of habitat improvements including water quality, fish availability, and riparian forest. Their return has been embraced by the local public and media coverage has been intense.

Eagle pairs are moving into suburban areas, nesting closer to human concentrations than they have since the beginning of their recovery. Many regular human activities are tolerated near some nests. Eagles at those nests appear to be comfortable with the local human activities. Within a human-dominated landscape, eagles tend to pick locations with little human activity in the immediate vicinity of the nest. Several pairs are tolerant of predictable, persistent road noise, boat traffic, or aircraft traffic near the nest. At least 1 nest is directly under a busy flight path into a major airport with no apparent conflict between the flight traffic since the eagles primarily fly at tree canopy height and below. Others are near busy highways or houses, but generally where foot traffic is infrequent near the nest tree and few obstructions lie between the nest and a body of water where the eagles regularly forage. In some cases, human foot traffic increases as the nesting season progresses and eagle sensitivity to human intrusions decreases. This growing tolerance is one of the factors contributing to the growth in eagle nesting population. However, all eagle nests are sensitive to direct human disturbance. Vigilance and public education is needed to maintain the success of eagle nests especially in urban landscapes. Curious on-lookers and photographers are sometimes the most intrusive humans at an active eagle nest. Human infrastructure in place before the nest is built is acceptable to the particular birds. Proactive educational efforts have met with increasing public acceptance and success including signage about “eagle etiquette” discouraging inappropriate human behavior around active nests that disturb eagles and may cause nest failure or abandonment. The Eagle Institute and the Pennsylvania Department of Natural Resources Bureau of State Parks have been educating the public on this same approach to enjoying eagles and limiting disturbance. Such proactive education measures are critical to the continued success of bald eagle recovery and an important part of the agency’s strategy for bald eagles (Gross and Brauning 2011).

We believe that bald eagle nesting populations may be approaching saturation levels in parts of Pennsylvania, as was predicted that saturation levels will be reached in the Chesapeake Bay population within the next decade (Watts et al. 2007). This leads to increased competition for quality nesting territories as the population grows. The presence of unmated adult bald eagles in the state during the breeding season indicate a growing floater population, suggesting the lack of suitable territories. These extra birds fill breeding vacancies as they become available, and are the individuals most likely to colonize new unoccupied habitat. This process leads to expansion out and away from areas with a high eagle concentration. More eagles will move into unoccupied habitat and begin to colonize lower quality watersheds. As the carrying capacity is reached, population growth rate will slow, indicating a maturing, healthy population.

Winter Season

The results of the Mid-winter Bald Eagle Survey (MWBES) for both the 2015 and 2016 surveys are provided here. Portions of 36 and 40 counties were surveyed by 57 and 76 cooperating eagle watchers, respectively. Participants conducted winter eagle surveys for almost 130 survey hours in 2015, and 102 hours and 2016. Two hundred fifty-six eagles were seen, 3.3 per 100 survey minutes in 2015 (Table 2), a decrease from 4.1 in 2014. Mild winter weather in the days preceding the survey maximized open water along many of the routes. When open water is rare, eagles tend to congregate in those areas increasing the numbers recorded during surveys. Center, Forest,

Huntington, Indiana, Lancaster and Westmoreland counties had the highest eagle to survey minute ratio. In addition to the bald eagles, an immature golden eagle was found on the Monroe and Pike survey. During the 2016 survey, participants conducted winter eagle surveys for about 100 hours. Two hundred twenty-five eagles were seen, 3.7 per 100 survey minutes (Table 2), a slight increase from 2015. Mild winter weather maximized open water along many of the routes. Chester, Lancaster, Huntington, Armstrong, Crawford and Westmoreland counties had the highest eagle to survey minute ratio. In addition to the bald eagles, 2 unidentified eagles were found on the Indiana/Westmoreland survey.

Despite the benefits of the Mid-winter Bald Eagle Survey (MWBES), this is the final year Pennsylvania will participate. The continued population growth of bald eagles, coupled with the decline of other species, means that we must focus the agency's limited resources on efforts to the recovery of those less secure species.

Education and Recreation

Web pages specific to bald eagles were viewed 11,610,500 times in 2015, a 3955% increase over 2014. The agency reaches a wide audience effectively, and an educated and understanding citizenship is the best long term protection for eagles, leading to voluntarily avoidance of disturbance and good "eagle etiquette" around nesting areas.

The chances of seeing a bald eagle in Pennsylvania are the best they have been in a 100 years. Enhancing the public's understanding, appreciation and interest in bald eagles, makes wildlife more available to everyone. The Pennsylvania Game Commission developed educational materials to promote recreational eagle watching and hosts them in the "Bald Eagle Watching in Pennsylvania" section of the website.

The public response to watching the natural drama of eagles raising their young was overwhelming. The camera provided a live look into the challenges and triumphs of nest life. The public's fascination with bald eagles was demonstrated with 11.5 million unique IP addresses viewing the nesting activities and the national network news channels featuring the nest when a snow storm covered the incubating adult. The nest also was featured on the Game Commission Facebook page with many people liking the daily reports. In addition, many organizations and individuals posted observations and photographs of the nest in social media, amplifying the agency's own successful educational outreach.

RECOMMENDATIONS

1. Identify and implement recovery actions from the Bald Eagle Management and recovery plan, 2010-2019.
2. Inventory eagle nests and monitor a randomly selected sample to determine productivity, coordinated by regional wildlife supervisors.
3. Protect breeding, roosting, and foraging habitat. Use established bald eagle Best Management Practices, propagation area or restricted area designations where appropriate to

protect established eagle nests with 330 meter (1,000 foot) buffer. Contribute eagle nest and winter roost data to Pennsylvania Natural Diversity Inventory, and U.S. Fish and Wildlife Service.

4. Develop and distribute materials to educate the public about eagle vulnerability to human activities and interference, emphasizing the importance of nesting habitat, and promoting eagle conservation through voluntary cooperation and understanding.

5. Develop and distribute information about eagle recreational viewing opportunities in the Commonwealth and ways the public can contribute to eagle monitoring and protection.

6. Use the charismatic, well-protected, and popular bald eagle as an umbrella species promoting the protection of riverine and palustrine habitat in Pennsylvania, and promoting the conservation of less known species that are high conservation priorities.

LITERATURE CITED

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- Watts, B. D., G. D. Therres, and M. A. Byrd. 2007. Status, Distribution, and the Future of Bald Eagles in the Chesapeake Bay Area. Waterbirds 30(Special Publication):25-38.

Table 1. Bald eagle nests and fledglings produced in Pennsylvania, based on 2015 productivity sample. Observed figures are for nests where the outcome was determined. The high estimate assumes all the nests with unknown fates succeeded and the low assumes all nests with unknown fates failed. Only nests with known results are used to calculate fledglings per nest.

Nest fate	Observed	High	Low
Fledged	59	89	59
Failed	13	13	43
Nest gone/no activity	34	34	34
Insufficient information	30	0	0
	68	83	83
Success rate	0.82	0.87	0.58
Fledglings	91	140	91
Productivity/nest	1.26	1.37	0.89

Table 2. 2015 and 2016 Mid-winter Bald Eagle Survey summary by county.

County	2015 bald eagles					2016 bald eagles				
	total	adult	immature	unknown	Eagles/100 minutes	total	adult	immature	unknown	Eagles/100 minutes
Allegheny	-	-	-	-	-	0	0	0	0	0.0
Armstrong	4	2	2	0	2.2	6	2	4	0	8.0
Armstrong/Indiana	-	-	-	-	-	1	0	1	0	1.1
Bradford	30	19	10	1	3.3	25	12	9	4	4.9
Bucks	5	2	3	0	2.2	10	0	10	0	4.3
Cameron/Potter	-	-	-	-	-	1	1	0	0	1.0
Carbon	0	0	0	0	0.0	2	0	2	0	1.4
Centre	8	3	5	0	8.9	2	2	0	0	4.4
Chester	2	2	0	0	0.8	3	1	2	0	60.0
Clarion	-	-	-	-	-	0	0	0	0	0.0
Clarion/Elk/Forest/Jefferson	-	-	-	-	-	8	6	2	0	2.4
Clearfield	0	0	0	0	0.0	-	-	-	-	-
Clinton	2	2	0	0	1.1	2	2	0	0	1.4
Columbia/Luzerne	3	3	0	0	1.6	5	4	1	0	4.1
Columbia/Northumberland	6	2	3	1	5.5	6	4	2	0	5.0
Crawford	11	8	3	0	2.6	28	14	14	0	7.8
Dauphin	1	0	1	0	0.6	0	0	0	0	0.0

Table 2. cont.

County	2015 bald eagles					2016 bald eagles				
	total	adult	immature	unknown	Eagles/100 minutes	total	adult	immature	unknown	Eagles/100 minutes
Dauphin/Northumberland	7	3	4	0	2.2	7	4	3	0	3.9
Elk	2	2	0	0	1.1	1	1	0	0	0.6
Elk/Forest	11	8	2	1	3.2	-	-	-	-	-
Erie	2	2	0	0	3.3	1	1	0	0	1.7
Fayette						0	0	0	0	0.0
Fayette/Somerset	3	1	0	2	0.6	4	4	0	0	-
Forest	6	6	0	0	14.3	-	-	-	-	-
Huntingdon	16	7	8	1	7.6	17	12	5	0	10.0
Indiana	2	2	0	0	11.8	-	-	-	-	-
Indiana/Westmoreland						4	4	0	0	3.3
Juniata	2	1	1	0	3.1	1	1	0	0	1.4
Juniata/Mifflin	1	0	1	0	1.7	0	0	0	0	0.0
Juniata/Perry	3	1	2	0	5.0	-	-	-	-	-
Lancaster	56	25	18	13	24.9	15	11	4	0	10.7
Lehigh/Northampton	-	-	-	-	-	0	0	0	0	0.0
Lycoming	15	11	4	0	3.8	-	-	-	-	-
Lycoming/Tioga	2	2	0	0	0.7	13	11	1	1	2.7
McKean/Warren	0	0	0	0	0.0	0	0	0	0	0.0
Mercer	15	10	5	0	3.8	10	9	1	0	3.6
Monroe/Pike	23	16	6	1	3.8	-	-	-	-	-
Northampton	-	-	-	-	-	7	7	0	0	1.7
Northumberland/Union	0	0	0	0	0.0	0	0	0	0	0.0
Perry	1	1	0	0	1.8	1	0	1	0	1.3
Pike	-	-	-	-	-	0	0	0	0	0.0
Pike/Wayne	-	-	-	-	-	4	4	0	0	2.2
Philadelphia	0	0	0	0	0.0	-	-	-	-	-
Somerset	0	0	0	0	0.0	-	-	-	-	-
Susquehanna	0	0	0	0	0.0	2	2	0	0	1.7
Tioga	-	-	-	-	-	29	7	22	0	6.7
Warren	3	2	1	0	5.0	2	2	0	0	3.3
Washington						0	0	0	0	0.0
Westmoreland	5	3	2	0	35.7	8	1	6	1	7.6
Wyoming	9	5	4	0	2.5	-	-	-	-	-
Total	256	151	85	20	3.3	225	129	90	6	3.7

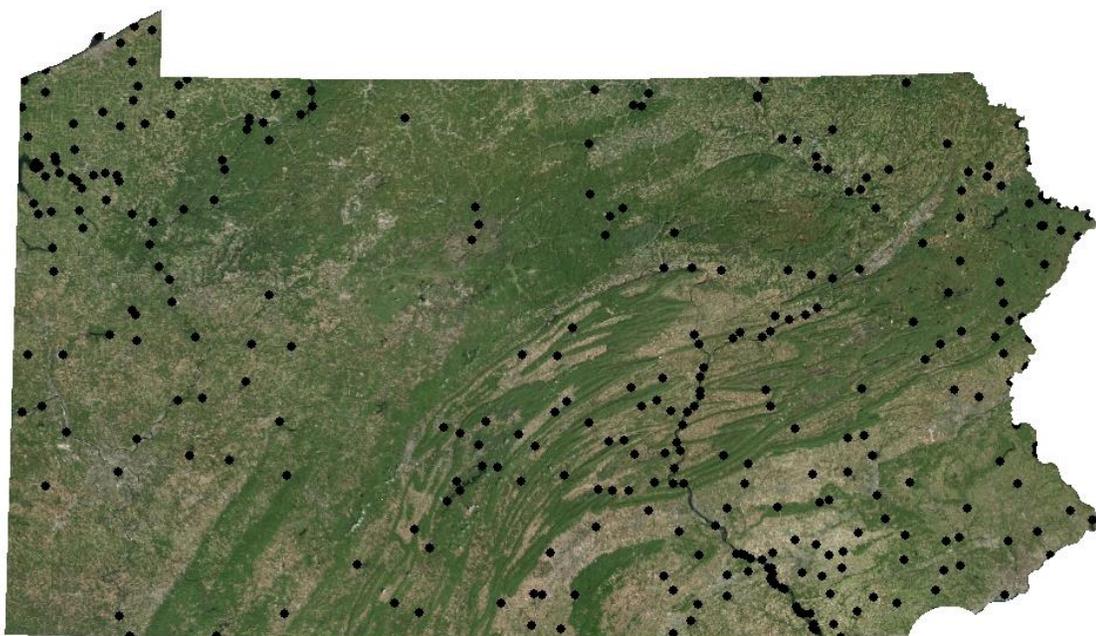


Figure 1. Active bald eagle nesting territories in Pennsylvania in 2015.