

**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 January to 31 December 2014

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

PREPARED BY: Patricia M. Barber and Douglas A. Gross

DATE: 24 February 2015

ABSTRACT In January 2014 the bald eagle was removed from Pennsylvania's list of endangered and threatened species. 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 breeding population remains stable in 2014 with at least 275 nesting pairs, 84.7% of nests successful, and 1.5 fledglings per nest. This nesting population has grown to the point where an exact census of eagle nests is difficult, so the population is certainly higher than these figures indicate. Wintering eagles were tracked using the nationally standardized Mid-winter Bald Eagle Survey; 265 eagles were found during surveys in 35 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 2014, documents related to eagles provided on the Game Commission's web site were downloaded over 250,000 times. The first live camera feed on a Pennsylvania bald eagle nest was enthusiastically received with over 3.3 million unique viewers. This educational outreach was precedent-setting and very successful for the agency's relation with the general 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 2014 breeding season by a variety of local observers, including regional biologists, other agency staff, and volunteers. A randomly selected sample of these territories was monitored more intensively to determine nesting success and productivity. Behavioral observations were used to estimate incubation, hatch and fledging. Nesting productivity is 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.

Several of the nests in the productivity sample were not monitored sufficiently to determine if they succeeded or failed. Nests with unknown fates cannot be assigned to the appropriate category. To determine if the population metrics specified in the bald eagle management plan are still being met, nesting success and productivity were calculated assuming all nests with unknown fates either succeeded or failed, thereby providing a range of estimates, including a maximum and minimum value for the population.

Migration

The Pennsylvania Game Commission (PGC) does not directly monitor eagle migration. However, the migration of bald eagles and other raptors is monitored by a coalition of raptor organizations including Hawk Mountain Sanctuary Association, Hawk Migration Association of North America, HawkWatch International, and Bird Studies Canada. This coalition collects raptor migration data and displays it through the Raptor Population Index (RPI) project (Crewe et. al. 2013)

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 2014 dates to run surveys were 10 or 11 January. 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.

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 an urban nest in Pittsburgh 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 urban public with wildlife.

RESULTS

Breeding Season

There were 275 nesting pairs identified this year, including 26 new nesting territories. The increase in population is difficult to track at this point and beyond the ability of agency staff to inventory each nesting pair, so these totals are certainly underestimates of the size and growth of the nesting bald eagle population. Nesting outcome was determined for 72 of the 96 nests in the productivity sample, and used to calculate nesting success. Based on direct observations, as of December 2014 nesting success was 84.7%, with 1.5 fledglings per nest. The most optimistic and conservative estimates, assuming all the 2014 nests with unknown results succeeded or failed, are still above the 60% goal for delisting (Table 1, Gross and Brauning 2011, U.S. Fish and Wildlife Service 2009). The breeding population continues to do well in 2014,

Bald eagle territories continue to increase across the Commonwealth. There now are bald eagles nesting in 59 or 87% of Pennsylvania counties, and 5 counties added multiple nesting territories (Fig. 1). The counties with the most nests, Crawford, Lancaster, York, Pike, Mercer and Tioga, represent centers of the state's eagle populations; Northwestern wetlands, Upper Delaware River Watershed, and Lower Susquehanna River (Leberman 1992, and Gross 2008). 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.

Not all nests were found. Breeding activities were observed in areas without an identified nest with some producing young, suggesting the presence of new pairs and at least a few 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 is well-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 to another county or state. New nesting territories usually are established near concentrations of active nests where there is access to good foraging. Bald eagles are still expanding into various parts of the state and new watersheds. The recently established nests in Allegheny County may signal a further expansion into the southwestern counties along the larger

streams. Colonization of the Pittsburgh area could echo the success eagles have had in the Philadelphia area.

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 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.

More eagle pairs are using suburban areas, nesting closer to human concentrations. Some pairs regularly fly over major highways to bring food to their nestlings. Many regular human activities are tolerated near some nests. Eagles at those nests appear to be comfortable with the local 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 1 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. 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).

Bald eagle nesting populations may be approaching saturation levels in parts of Pennsylvania. It has been predicted that saturation levels will be reached in the Chesapeake Bay population within the next decade (Watts et al. 2007). Competition for quality nesting territories will increase as the population grows. Unmated adult bald eagles in the state during the breeding season indicate a growing floater population. 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 high eagle concentration. As the carrying capacity is reached population growth will slow indicating a maturing, healthy population. More eagles will move into unoccupied habitat and begin to colonize higher quality watersheds that are more than 43 miles from an occupied territory (Whittington and Allen 2008). The timing of colonization events is unpredictable, but eagles will find good habitat where there is less competition for resources and little human interference. There certainly is room for additional territories in parts of the state with healthy watersheds and forest cover including the southwestern counties and the “big woods” part of Northwestern and North-central regions.

Migration

Trends at the vast majority of count sites in the eastern North American show increases in the number of birds seen during the last 10 seasons (Brandes et. al. 2013) illustrating that Pennsylvania's growing population is part of larger, long term improvements for eagles.

Winter Season

Portions of 35 counties were surveyed by 75 cooperating eagle watchers. Participants conducted winter eagle surveys for almost 109 survey hours in 2014. Two hundred sixty-five eagles were seen, 4.1 per 100 survey minutes (Table 2), an increase from 2.9 in 2013. Harsh winter weather in the days preceding the survey minimized 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. Bucks, Lancaster, Perry, Warren and Westmoreland counties had the highest eagle to survey minute ratio. In addition to the bald eagles, an immature golden eagle was found in Lancaster County and an adult on the Monroe and Pike survey.

The Mid-winter Bald Eagle Survey provides other important benefits, including an early season check for nesting activity and increasing public participation. Participants record eagles building new nests, and refurbishing established nests, and locate existing nests while visibility is good. Increasing public participation and appreciation for eagles improves the long term outlook for bald eagles in Pennsylvania.

Education and Recreation

Web pages specific to bald eagles were downloaded 250,194 times in 2014, a 364% increase over 2013. 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. Many citizens may not know they have this opportunity, how or where to watch eagles. Enhancing the public's understanding, appreciation and interest in bald eagles, makes wildlife more available to everyone. The PGC 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 the opportunity to watch 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 well demonstrated with 3.3 million unique IP addresses recorded viewing the nesting activities. The nest also was featured on the PGC 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.

STATUS REVISION

After reaching all the population recovery goals identified in the bald eagle management plan, the Board of Commissioners voted in September to support the change in legal status from threatened to Protected. That proposed regulation was ratified in January, 2014 and the bald eagle was officially removed from the state's list of endangered and threatened species. Conservation will now default back to the U.S. Fish and Wildlife Service under the Bald and Golden Eagle Protection Act of 1940.

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. Coordinate mid-winter bald eagle surveys in the state and cooperate with USACE in the nationwide winter eagle survey until 2016.

4. Develop more detailed survey protocols and tracking routines to determine nesting activity. More thorough guidance is needed for local observers monitoring nests.

5. 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.

6. 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.

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

8. 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

Brandes, D., D. Oleyar, S. Hoffman, and L. Goodrich. The Raptor Population Index, 2013 Regional Trend Summaries and Conservation Assessments. Available at <http://rpi-project.org/2013/assessments2013.php>

Crewe, T., P. Taylor, D. Lepage, L. Goodrich, J. Brown, and J. Sodergren. The Raptor Population Index, 2013 Analysis Methods and Trend Results. Available at <http://rpi-project.org/2013/>

- Gross, D. A. 2008. Bald Eagle Breeding and Wintering Surveys. Annual Job Report (2007). Pennsylvania Game Commission, Harrisburg, USA.
- Gross, D. A. and D. W. Brauning. 2011. Bald Eagle Management Plan for Pennsylvania. (2010–2019). Bureau of Wildlife Management, Pennsylvania Game Commission, Harrisburg, USA.
- Leberman, R. C. 1992. Bald Eagle, *Haliaeetus leucocephalus*. Page 92-93 in D. W. Brauning, editor. Atlas of Breeding Birds in Pennsylvania. University of Pittsburgh Press, Pittsburgh, Pennsylvania, USA.
- U.S. Fish and Wildlife Service. 2009. Post-delisting Monitoring Plan for the Bald Eagle (*Haliaeetus leucocephalus*) in the Contiguous 48 States. U.S. Fish and Wildlife Service, Divisions of Endangered Species and Migratory Birds and State Programs, Midwest Regional Office, Twin Cities, Minnesota, USA.
- 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 2014 productivity sample. Observed represents what was documented by nest visits. 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	61	72	61
Failed	11	11	22
Nest gone/no activity	13	11	11
Insufficient information	11	2	2
	72	83	83
Success rate	0.85	0.87	0.73
Fledglings	105	116	105
Productivity/nest	1.46	1.40	1.27

Table2. 2014 Mid-winter Bald Eagle Survey summary by county.

County	Bald eagles counted				Eagles/100
	total	adult	immature	unknown	minutes
Armstrong	2	1	1	0	1.08
Bradford	12	9	3	0	4.00
Bucks	59	8	51	0	10.83
Cameron	1	1	0	0	1.11
Centre	8	4	4	0	4.17
Carbon	0	0	0	0	0.00
Chester	2	1	1	0	0.58
Clearfield	0	0	0	0	0.00
Clinton	2	2	0	0	0.77
Columbia	5	4	1	0	4.24
Crawford	13	9	3	1	2.41
Dauphin	3	3	0	0	1.22
Elk	1	1	0	0	0.63
Erie	4	2	2	0	4.00
Fayette/Somerset	3	2	1	0	1.67
Forest	5	0	5	0	2.67
Huntingdon	5	4	1	0	3.33
Indiana	1	1	0	0	1.25
Juniata	1	0	1	0	0.91
Lancaster	60	33	27	0	27.91
Lycoming	7	7	0	0	2.12
Mckean/Warren	0	0	0	0	0.00
Mercer	19	11	8	0	5.76
Mifflin	1	0	1	0	1.67
Monroe/Pike	27	13	14	0	4.50
Perry	4	0	4	0	11.43
Somerset	0	0	0	0	0.00
Susquehanna	2	2	0	0	1.43
Tioga	3	2	1	0	1.11
Union	0	0	0	0	0.00
Venango	0	0	0	0	0.00
Warren	7	3	4	0	11.67
Westmoreland	3	2	1	0	37.50
Wyoming	5	4	1	0	2.78
Total	265	129	135	1	4.08

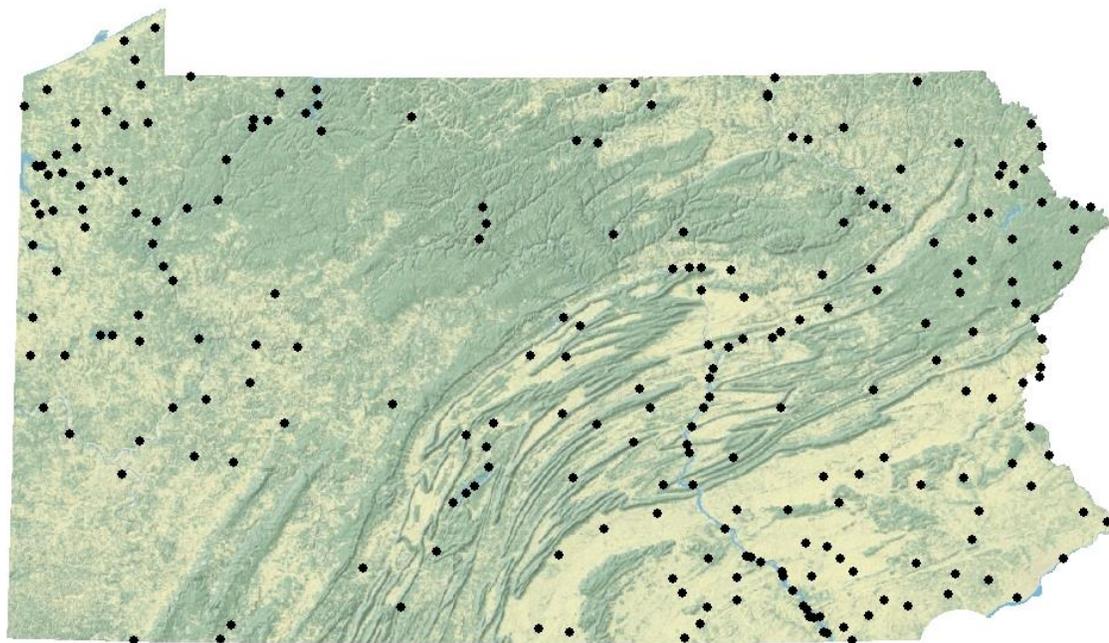


Figure 1. Active bald eagle nesting territories in 2014.