

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

**PROJECT CODE NO.:** 06723

**TITLE:** Wetland Research/Management

**JOB CODE NO.:** 72302

**TITLE:** Wetland Nesting Bird Surveys

**PERIOD COVERING:** 1 July 2015 to 30 June 2016

**WORK LOCATIONS:** Statewide

**PREPARED BY:** Alison Fetterman and Patricia Barber

**DATE:** 25 July 2016

**COOPERATING AGENCIES AND ORGANIZATIONS:** Department of Conservation and Natural Resources (DCNR), U.S. Forest Service, and PA Department of Military and Veterans Affairs; Pennsylvania Society for Ornithology (PSO); Three Rivers Bird Club; Bucks County Audubon; John Heinz National Wildlife Refuge.

**ABSTRACT** Almost all Pennsylvania's wetland bird species have declined in recent decades as documented by the Second Atlas of Breeding Birds in Pennsylvania and the agency's surveys. Most bird species listed as state endangered and threatened in Pennsylvania breed in wetlands. During the 2014-15 breeding seasons, wetlands were identified and available to registered observers for surveys, through an ArcGIS online interface on the Game Commission public website. These marsh bird surveys focused on secretive nesting marsh birds including: pied-billed grebe, American bittern, least bittern, black rail, king rail, Virginia rail, sora, common gallinule, and American coot. Surveys were conducted between May 15 and June 30, 2015 using an audio playback protocol adapted from the Standardized North American Marsh Bird Monitoring Protocols and very similar to that used in the Second Pennsylvania Breeding Bird Atlas. The 2015 season focused on wetlands greater than 10 hectares (24.7 acres) with a priority to cover 11 historical breeding sites for the target species. Surveys were conducted at 48 marshes in 18 counties, successfully detecting seven of the nine target species. The Marsh Creek wetlands of SGL 313, Tioga County, known as "the Muck" yielded the most wetland birds (21) and species (5) of any location surveyed.

**OBJECTIVES**

1. Inventory and monitor 9 species of wetland nesting birds in Pennsylvania, focusing on wetlands greater than 10 hectares (24.7 acres) in size with an emphasis on 11 historically important breeding sites in Pennsylvania, conducting surveys in at least 2 survey periods during the 6 week

breeding season. Species surveyed included endangered, threatened and species of greatest conservation need (SGCN) in the Wildlife Action Plan (Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission 2015).

2. Engage and educate the public about our SGCN wetland birds and how they can help monitor and protect these species for the enjoyment of future generations and the functioning of our ecosystems.

3. Use an ArcGIS online interface on the Game Commission website for wetland identification and online data entry.

## METHODS

This marsh bird monitoring project methodology was adapted from the Standardized North American Marsh Bird Monitoring Protocols (Conway 2009) and was very similar to that used in the Second Pennsylvania Breeding Bird Atlas (Lanzone et. al. 2006). The adapted protocol was available to the public on a Pennsylvania Game Commission web page. Volunteers were recruited through PABIRDS Listserve, Pennsylvania eBird, state and private organizations, and local bird clubs. “Search for Marsh Birds” that was published in the May 2015 edition of Pennsylvania Game News (Fetterman 2015) with a request for assistance from the public. Interested observers were directed to an online ArcGIS interface created for this project by the Pennsylvania Game Commission, where pre-determined wetlands were identified on a map of Pennsylvania. The interface allowed users to easily identify, reserve, and survey wetland locations via a computer or mobile device. All data entry was done online by observers, through the ArcGIS interface. Other reports were sent to eBird or to the Game Commission Wildlife Diversity staff through a special e-mail address, marshbirds@pa.gov. This approach increased the number of wetlands surveyed and allowed more opportunities for public contributions.

Target species include American bittern (*Botaurus lentiginosus*), least bittern (*Ixobrychus exilis*), pied-billed grebe (*Podilymbus podiceps*), sora (*Porzana carolina*), king rail (*Rallus elegans*), black rail (*Laterallus jamaicensis*), Virginia rail (*Rallus limicola*), American coot (*Fulica americana*), and common gallinule (*Gallinula chloropus*). Other conservation priority species or wetland indicators that may be encountered include marsh wren (*Cistotorus palustris*), sandhill crane (*Grus canadensis*), willow flycatcher (*Empidonax trailli*), Wilson’s snipe (*Gallinago delicata*), wood duck (*Aix sponsa*), green-winged teal (*Anas crecca*), blue-winged teal (*Anas discors*), osprey (*Pandion haliaetus*), and bald eagle (*Haliaeetus leucocephalus*), could be recorded in a notes section. Most of these are listed as Species of Greatest Conservation Need (Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission 2015).

The Pennsylvania Game Commission has established website pages for the state endangered and threatened wetland species including American bittern, least bittern, common tern, black tern, king rail, sedge wren, northern harrier, and short-eared owl. These website pages increase the agency’s ability to engage the public in these surveys and acquire more information about the target species and the wetlands including these surveys. Requests for assistance link to these pages as a resource to the interested public. Each page includes status, population trend, identifying characteristics, biology, natural history, preferred habitat, management programs, and

supporting literature. The target audience for these pages is educators, students, and adults interested in wildlife and conservation.

Eleven marshes were identified by their historical significance as nesting areas of the target wetland birds. All of these are wetlands at least 10 hectares (24.7 acres) with a history of supporting wetland birds (Table 1) and were designated as Pennsylvania Important Bird Areas reflecting their importance to this suite of birds (Crossley 1999). Survey points were generated by referencing historical surveys and reflecting the National Protocol of points 400 meters apart (Conway 2009) and limited to emergent wetlands. The survey points were then adjusted in the field by observers due to accessibility. Two replicates were done for most survey points at each site. Points at Marsh Creek were completed 3 times. Volunteers were encouraged to survey other marshes greater than 10 hectares (identified on the web map) as well as other areas they were familiar with as nesting areas for the target species.

Surveys were conducted between 15 May and 30 June either in the morning or the evening, when marsh birds are most detectable (Conway 2009). Morning surveys were conducted anytime from first light (30-45 minutes before sunrise) to 3 hours after sunrise. Evening surveys were conducted from 3 hours before sunset to dark (30-45 minutes after sunset). The surveys are divided into 3, 2 week periods: 1) 15-31 May; 2) 1-14 June; 3) 15-30 June. Surveys for the priority marshes listed above were conducted once each during the first and second periods. As these birds are secretive, a bird may not respond to the playback each time. Therefore, as these areas are of interest, it was decided to conduct at least 2 surveys during the 2015 breeding season. Each survey stop includes a 14-minute audio playback protocol that begins with a 5 minute silent period followed by 30 seconds of each species calls and 30 seconds of silence between each species. During each survey, observers record species encountered, ground and water cover, and weather conditions.

## **RESULTS**

In 2015, 145 surveys were conducted at 48 marshes in 18 counties; Bucks, Butler, Carbon, Chester, Crawford, Delaware, Franklin, Huntingdon, Juniata, Lackawanna, Lawrence, Lebanon, Luzerne, Mercer, Monroe, Pike, Susquehanna, and Tioga. The marsh bird survey website was visited by volunteers and staff. Thirty-three volunteers registered as observers and 13 were able to conduct surveys. A total of 48 wetlands were evaluated in 18 counties, including Shohola Marsh Reservoir (State Game Land [SGL] 180) where both a sora and Virginia rail were found.

During 2015, 6 of the target marsh bird species were detected at 15 of the 119 surveyed locations in 10 counties across all periods (Table 2); Butler, Carbon, Chester, Crawford, Delaware, Huntingdon, Lebanon, Mercer, Pike, and Tioga. Total detections of each species were: black rail, 0; least bittern, 6; sora 7; Virginia rail, 28; king rail, 0; American bittern, 3; common gallinule, 5; American coot, 0; and pied-billed grebe, 1. No black terns were observed during the surveys. Six of the 11 priority marsh locations detected at least 1 of these target marsh bird species in 1 of the 2 survey periods (Table 3). These priority marsh locations accounted for all American bittern, common gallinule, and pied-billed grebe detections and 17% of least bittern, 14% of sora, and 43% of Virginia rail detections in 2015.

The project accumulated marsh surveys through the 3 survey periods. During Period 1, 15-31 May, 20 marshes were evaluated, totaling 75 survey points where 6 of the 9 target species were detected. During Period 2, 1-14 June, 25 marshes were evaluated, totaling 85 survey points where 5 of the target species were detected. During Period 3, 15-30 June, 31 marshes were evaluated, totaling 41 survey points, where 4 of the target species were detected.

With an extra survey replicate this year at Marsh Creek it might not seem surprising that the wetlands yielded more wetland birds (21) and species (5) than any location surveyed, but if the final survey period is eliminated the most individuals and species were still detected (20 individuals and 4 species). The low numbers of marsh birds found at Conneaut and Geneva Marshes are particularly alarming since these are the locations where most marsh birds had been found in previous agency wetland surveys (Brauning et al. 2002, Brauning and VanFleet 2007, Gross et al. 2010). These results reinforce the impression that some of our secretive marsh birds are indeed critically endangered or declining including American bittern and American coot. Appropriate management may be necessary to improve the capacity of these wetlands to support marsh birds of conservation concern.

During 2015, the Pennsylvania Game Commission wetland endangered and threatened bird web pages were visited more than 12,000 times (Table 4).

## **RECOMMENDATIONS**

1. Establish a long-term monitoring database of wetland birds.
2. Continue conducting wetland surveys for marshes 3-10 hectares as well as traditionally surveyed wetlands greater than 10 hectares.
3. Repeat wetland bird surveys at least every 4 years. The next survey is planned for 2019.
4. Include management and conservation of wetland birds of conservation priority in comprehensive game lands management plans.
5. Monitor the presence and extent of non-native invasive plant species (particularly purple loosestrife).
6. Utilize Game Commission resources to keep channels of travel throughout the marsh open, both as a habitat-improvement (avoid the constant expansion of Spatterdock through the marsh) and to facilitate future surveying efforts.
7. Work with other organizations to monitor, conserve, and manage wetland birds that are especially vulnerable due to their rarity, isolation and secretive nature.
8. Increase participation of the public in organized surveys and less formal monitoring projects like Pennsylvania eBird and increase the quality of those reports by educating the users about the use of eBird features like photographs, detailed notes, and breeding codes that increase the credibility and utility of these reports.

9. Continue and expand engagement and education of the public concerning wetland birds and their habitats.

10. Evaluate wetlands outside of the survey period to determine if the habitat is suitable, in order to more efficiently use the short survey period during the breeding season.

#### **LITERATURE CITED**

Brauning, D. W., S. Hoffman, L. Mangel. 2002. Conneaut Marsh SGL/IBA monitoring. Final Job Report 71101 and 71102. Pennsylvania Game Commission, Harrisburg, USA.

Brauning, D. W. and K. Van Fleet. 2007. Wetland Nesting Bird Surveys. Final Job Report 72302. Pennsylvania Game Commission, Harrisburg, USA.

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-2. Wildlife Research Report #2009-02. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Research Unit, Tucson, Arizona, USA.

Crossley, G. J., compiler. 1999. A Guide to Critical Bird Habitat in Pennsylvania: Pennsylvania Important Bird Areas Program. Pennsylvania Audubon Society, Harrisburg, USA.

Fetterman, A. 2015 Search for Marsh Birds. Pennsylvania Game News May:34–37.

Gross, D. A. and C. D. Haffner. 2010. Wetland bird communities: boreal bogs to open water. Pages 44-61 *in* Avian Ecology and Conservation: A Pennsylvania focus with national implications. The Pennsylvania Academy of Science, Easton, USA.

Lanzone, M. J., R. S. Mulvihill and T. M. Miller. 2006. 2nd Pennsylvania breeding bird atlas marsh bird survey protocols. Powdermill Avian Research Center, Rector, Pennsylvania, USA.

Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission. 2015. Pennsylvania Wildlife Action Plan, 2015-2025. C. Haffner and D. Day, editors. Pennsylvania Game Commission and Pennsylvania Fish and Boat Commission, Harrisburg, USA.

Table 1. Priority Important Bird Area marshes including ownership, area surveyed and survey points completed including replicates. All surveys covered emergent wetlands and most points at each site were surveyed twice. Marsh Creek points were completed 3 times.

<b>Marsh Name</b>	<b>Owner</b>	<b>Acres</b>	<b>Surveys</b>
Ackley Swamp (SGL <sup>a</sup> 292)	Game Commission	205	8
Conneaut/Geneva Marsh (SGL <sup>a</sup> 213)	Game Commission	1274	22
Cussawago Bottom (SGL <sup>a</sup> 269)	Game Commission	61	6
Great Marsh	Privately owned	203	9
John Heinz National Wildlife Refuge	USFWS <sup>b</sup>	345	18
Moraine State Park	DCNR <sup>c</sup>	55	8
Pennsy, Black & Celery Swamps (SGL <sup>a</sup> 151/284)	Game Commission	178	13
Pymatuning/Hartstown Complex (SGL <sup>a</sup> 214)	Game Commission	304	22
Quakertown Swamp(SGL <sup>a</sup> 139)	Game Commission	90	6
The Glades (SGL <sup>a</sup> 95),	Game Commission	169	12
Marsh Creek Wetlands “The Muck” (SGL <sup>a</sup> 313)	Game Commission	216	21

<sup>a</sup> State Game Land (SGL)

<sup>b</sup> U.S. Fish and Wildlife Service (USFWS)

<sup>c</sup> Pennsylvania Department of Conservation and Natural Resources (DCNR)

Table 2. Marsh bird detections by County during the 2015 breeding season.

County	Least bittern	Sora	Virginia rail	American bittern	Common gallinule	Pied-billed grebe
Butler	1	0	0	0	0	0
Carbon	0	1	2	0	0	0
Centre	0	0	0	0	0	0
Chester	0	0	3	0	0	0
Crawford	0	0	6	1	5	0
Dauphin	0	0	0	0	0	0
Delaware	3	0	0	0	0	0
Franklin	0	0	0	0	0	0
Huntingdon	1	0	0	0	0	0
Jefferson	0	0	0	0	0	0
Juniata	0	0	0	0	0	0
Lackawanna	0	0	0	0	0	0
Lawrence	0	0	0	0	0	0
Lebanon	0	0	2	0	0	0
Lehigh	0	0	0	0	0	0
Luzerne	0	0	0	0	0	0
Mercer	0	0	1	0	0	0
Monroe	0	0	0	0	0	0
Pike	0	1	1	0	0	0
Susquehanna	0	0	0	0	0	0
Tioga	1	5	12	2	0	1
Washington	0	0	0	0	0	0
Wayne	0	0	0	0	0	0
Totals	6	7	27	3	5	1

Table 3. Marsh bird detections at priority marsh locations in 2015. Targeted species with no observations are not included in the table.

Marsh Name	Least bittern	Sora	Virginia rail	American bittern	Common gallinule	Pied-billed grebe
Ackley Swamp	0	0	0	0	0	0
Conneaut	0	0	6	1	4	0
Cussawago Bottom	0	0	0	0	0	0
Geneva	0	0	0	0	0	0
John Heinz NWR	3	0	0	0	0	0
Moraine State Park	1	0	0	0	0	0
Pennsy, Black & Celery Swamps	0	0	1	0	0	0
Pymatuning/Hartstown Complex	0	0	1	0	1	0
Quakertown Swamp	0	0	0	0	0	0
The Glades	0	0	0	0	0	0
The Muck	1	5	12	2	0	1
Total birds	5	5	19	3	5	1
Number of priority wetlands	3	1	4	2	2	1

Table 4. Wetland nesting bird web pages viewed during 2015.

Common name	Scientific name	Status	Views
American bittern	<i>Botaurus lentiginosus</i>	Endangered	1230
black tern	<i>Chlidonias niger</i>	Endangered	1090
king rail	<i>Rallus elegans</i>	Endangered	1009
least bittern	<i>Ixobrychus exilis</i>	Endangered	804
sedge wren	<i>Cistothorus platensis</i>	Endangered	1159
short-eared owl	<i>Asio flammeus</i>	Endangered	2276
northern harrier	<i>Circus cyaneus</i>	Threatened	1223
wetland annual reports			1749
marsh bird survey protocol			480
Total			12283

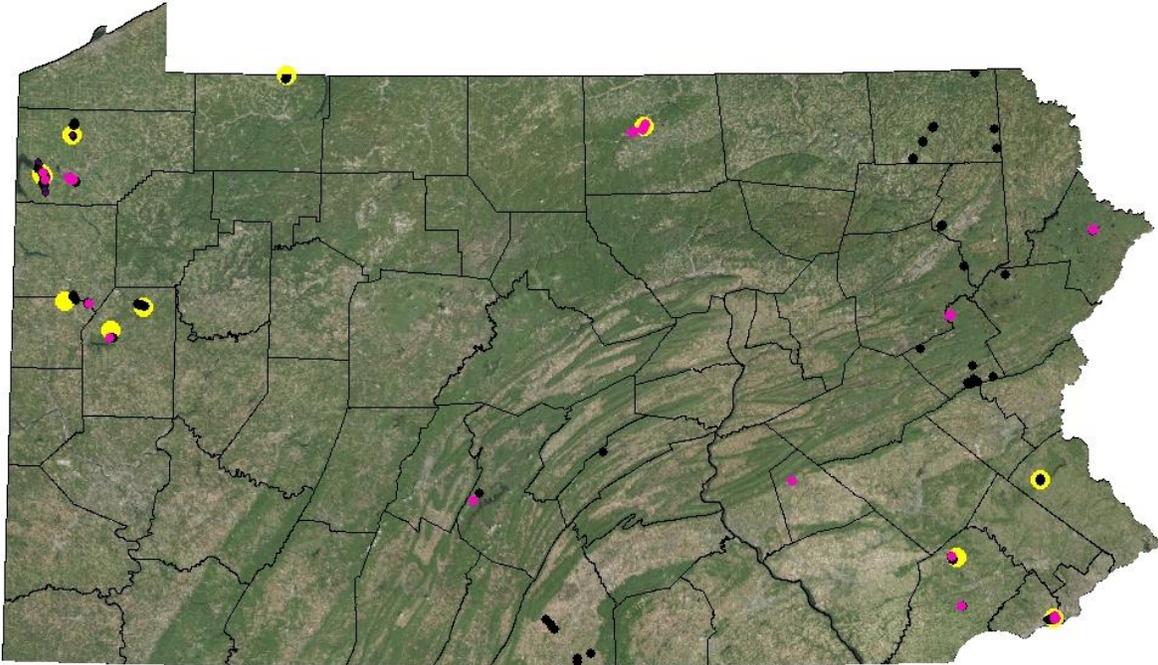


Figure 1. Marsh bird surveys conducted during the 2015 breeding season in Pennsylvania, yellow points are priority wetlands, black indicates surveys conducted, pink indicates target species detected.