

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

PROJECT CODE NO.: 05011

TITLE: Conservation Reserve Enhancement Program Administration and Monitoring

JOB CODE NO.: 01004A

TITLE: Effects of Local and Landscape Features on Avian Use and Productivity in Conservation Reserve Enhancement Program (CREP) Fields

PERIOD COVERED: 1 July 2001 to 30 June 2002

COOPERATING AGENCIES: Pennsylvania Game Commission and Pennsylvania State University School of Forest Resources

WORK LOCATIONS: Montour, Columbia, Berks, Schuylkill, Union, Northumberland, and Snyder Counties

PREPARED BY: Kevin Wentworth and Margaret Brittingham, School of Forest Resources, The Pennsylvania State University, and Scott Klinger, Pennsylvania Game Commission.

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Abstract: Seventeen fields were monitored in Montour and Columbia counties in 2001, and 54 fields were monitored in Montour, Union, Snyder, Northumberland, Schuylkill, and Berks counties in 2002 in order to determine the abundance and productivity of grassland birds in the counties of southeast Pennsylvania that are part of the Conservation Reserve Enhancement Program (CREP). Fields were chosen in different size classes: small (<4 ha), medium (8-12 ha), and large (>16 ha). Surveys for abundance of grassland birds were conducted twice over both summers. Nests were located in all the fields throughout the summer of 2001 while only fields in Montour, Union, and Snyder counties were searched in 2002. Data collection will continue for the next 2 summers. The final report will be prepared by 1 July 2005.

OBJECTIVES

1. To determine the effects of CREP on abundance, distribution, and productivity of grassland birds.

2. To determine how use of and productivity within warm-season and cool-season fields vary with field size, age, and adjacent landscape.

3. To determine differences between the use and productivity of CREP fields and hayfields by grassland birds.

4. To develop management guidelines for maximizing benefits of CREP for grassland birds.

PROCEDURES

We surveyed birds within each study field using 100 m transects (25 m on each side of the transect; Best et al 1997). Transects were located ≥ 50 m from an edge (when possible) and located no closer than 50 m from each other. We established as many transects as possible within the field that met the above criteria (Best et al. 1997). We conducted 2 surveys in 2001 (between 28 May-5 June and 6 June-5 July) and 2002 (between 24 May-5 June and 24 June-5 July) to detect early breeders and to detect neotropical migrants, which tend to breed later. The surveys were conducted from sunrise to 3 hours after sunrise, and were not conducted when it was raining or winds were greater than 16 kph (Best et al. 1997).

For the summer 2001 field season, we chose Montour and Columbia Counties as study sites for a pilot study because of the availability of warm-season grass fields within the 3 different field size classifications. We located cool-season grass fields and hayfields as close as possible to the warm-season fields to minimize localized differences.

In 2002, we surveyed birds using distance sampling. Transects were located 100 m from the edge of the field and then every 250 m until the end of the field (leaving at least 50 m from far edge). Singing male birds were surveyed using binoculars to locate the position of the male, and then the distance and angle from the transect was recorded using Ranging 400® range finders and a compass.

For the summer 2002 field season, we surveyed and searched for nests in Montour, Union, and Snyder Counties. We also surveyed in Schuylkill, Berks, and Northumberland Counties. These counties were chosen randomly from those counties available in the CREP program with enough fields (3) in the large (>16 ha), medium (8-12 ha), and small (<4 ha) field categories. Because the management plans for fields include mixtures of warm and cool-season grasses, fields were chosen randomly based on size. Hayfields of medium size were located where possible.

We located active nests by walking through each field every 3-5 days, watching female and male behaviors and scanning the vegetation. Nests were marked using colored flagging ~10 m to the north of the nest, and GPS coordinates were taken to help relocate the nests. Active nests were monitored every 3-5 days, to determine success or cause of failure.

In 2002, we placed remote video cameras on active nests to try to determine the different species of nest predators.

We measured local habitat structure including density (Robel et al. 1970), height of grass, depth of litter, and amount of vegetative cover (i.e. percent cover of warm or cool-season grass, ground litter, standing litter [dead stems that are still standing], woody vegetation, forb and bare ground; Daubenmire 1959). These were measured at each nest and 3 m away from the nest in the 4 cardinal directions after the termination of nesting activity. Each field was also sampled using 6 equally-spaced samples along the already established transects for the bird surveys (McCoy et al. 2001). The amount of vegetative cover, litter depth, and vegetation density were collected at each sample point. Field vegetation sampling took place at the same time the bird surveys were conducted. The difference in the percentage of cover types within and between fields will allow us to assess the effects of 2 CREP practices (warm-season grasses and cool-season grasses). We also recorded

local landscape features such as adjacent habitat and the distance of each nest from edges to help identify any relationships with productivity and use of the fields by different species.

FINDINGS

There was not a significant difference between the number of birds seen during the first survey and the second in 2001. Grasshopper sparrows, savannah sparrows, vesper sparrows, bobolinks, and meadowlarks never reached a 50% location value at any field size.

Abundance data are continuing to be analyzed and will be included in the next report.

In 2001, we located 300 nests from 12 different species of birds in the 17 fields (Table 1). In 2002, we located 274 nests from 13 different species of birds in the 30 fields (Table 2). Cumulatively, we have located 574 nests from 17 different species in 44 fields (Table 3).

The overall nest success in 2001 was 18.64%, and 31.4% in 2002. In 2001 the more common birds, except for eastern meadowlark, had a higher than average success: red-winged blackbirds (19.61%), field sparrows (23.40%), song sparrows (35.72%), eastern meadowlarks (11.29%), and grasshopper sparrows (30.64%). In 2002, grasshopper sparrows (12.9%) and wild turkeys (17.8%) were below the average, and field sparrows (46.0%) and vesper sparrows (46.3%) were well above average. The most common cause of nest loss in 2001 was predation (161 nests); 19 nests were mowed (all on the hayfields), and 14 nests were abandoned. There were still 7 nests active at the end of the field season. In 2002, the most common cause of nest loss was also predation (109 nests), with 7 nests mowed (3 on hayfield and 4 on CREP fields), 16 nests were abandoned, and 20 nests were still active. No cowbird eggs hatched in either year. All nests with cowbird eggs in 2001 were in field sparrow nests, and they were all abandoned. In 2002 brown-headed cowbird eggs were found in indigo bunting nests and a song sparrow nest, but both were depredated. There is a relationship between the field type and size with respect to the success of nests when comparing different field types. Most of this relationship occurs because of the overabundance of unsuccessful nests in <4 ha and 8-12 ha warm-season grass fields. There is no significant difference between the number of successful and unsuccessful nests and the field size they are found in for 2001, 2002, or pooled data across both years.

Cameras were placed on 6 nests: red-winged blackbirds (4), dickcissel (1), and song sparrow (1). All nests were successful except for 1 red-winged blackbird that abandoned the nest after placement of the camera.

Productivity data are still being analyzed and more will be included in the next report.

All bird species, with at least 3 nests, significantly selected higher vegetation to nest in than the field average. Even ground nesting birds (e.g. eastern meadowlark and grasshopper sparrows) nested at the base of higher than average vegetation. Most birds also chose areas with a deeper litter depth. Eastern meadowlarks preferred open areas, while field sparrows and red-winged blackbirds selected denser areas. Field sparrows, red-winged blackbirds, and wild turkeys under selected for forb coverage. Red-winged blackbirds were the only birds to show a preference for warm-season grass

coverage. Eastern meadowlarks, field sparrows, and red-winged blackbirds chose areas with higher woody coverage. Meadowlarks may have been selecting areas with blackberry coverage on the ground, where field sparrows and red-winged blackbirds were selecting multi-flora rose and autumn olive, respectively. Field sparrows, grasshopper sparrows, song sparrows, and red-winged blackbirds all selected areas with less bare ground.

Local habitat characteristic data are still being analyzed and more will be included in the next report.

LITERATURE CITED

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Table 1. Number of nests per grassland bird species in 17 fields in Montour and Columbia Counties, Pennsylvania, 28 May-31 July 2001.

Species	Number of nests	% of total nests
Red-winged blackbird	179	59.67
Field sparrow	82	27.33
Song sparrow	11	3.67
Eastern Meadowlark	7	2.33
Grasshopper sparrow	6	2.00
Indigo bunting	3	1.00
Mallard	3	1.00
Wild turkey	3	1.00
Common yellowthroat	2	0.67
Savannah sparrow	2	0.67
American robin	1	0.33
Ring-necked pheasant	1	0.33

Table 2. Number of nests per grassland bird species in 30 fields in Montour, Union, and Snyder Counties, Pennsylvania, summer 2002.

Species	Number of nests	% of total nests
Red-winged blackbird	161	58.8
Field sparrow	43	15.7
Song sparrow	31	11.3
Grasshopper sparrow	10	3.7
Wild turkey	10	3.7
Indigo bunting	56	2.2
Vesper sparrow	35	1.9
Mallard	13	1.1
American goldfinch	1	0.4
Bobolink	1	0.4
Dickcissel	1	0.4
Northern cardinal	1	0.4
Ring-necked pheasant	1	0.4

Table 3. Number of nests per grassland bird species in 44 fields in Montour, Columbia, Union, and Snyder Counties, Pennsylvania, 2001 and 2002.

Species	Number of nests	% of total nests
Red-winged blackbird	340	59.2
Field sparrow	125	21.8
Song sparrow	42	7.3
Grasshopper sparrow	16	2.8
Wild turkey	13	2.3
Indigo bunting	9	1.6
Eastern meadowlark	7	1.2
Mallard	6	1.0
Vesper sparrow	5	0.9
Common yellowthroat	2	0.3
Savannah sparrow	2	0.3
Ring-necked pheasant	2	0.3
American goldfinch	1	0.2
Bobolink	1	0.2
Dickcissel	1	0.2
Northern cardinal	1	0.2
American robin	1	0.2