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The Status of a PA Endangered Bird- the Upland Sandpiper

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The Status of a PA Endangered Bird- the Upland Sandpiper

Abstract
The upland sandpiper (*Bartramia Longuardia*) has experienced a steep population decline in the northeastern U.S. since the mid-20th Century. In Pennsylvania it was found in less than 0.5% of atlas blocks during the *Second Atlas of Breeding Birds in Pennsylvania* project (2nd PBBA; 2004-09) and breeding was confirmed at only two locations. Due to continued declines and a small population size, the upland sandpiper was listed as PA endangered in 2012. During May 2012 the areas around 15 2nd PBBA upland sandpiper sightings were resurveyed by Gettysburg College students and volunteer birdwatchers. The aim was to establish whether the atlas records related to persisting populations. We used five-minute audio playback at up to 10 locations within 4km of the atlas sightings. A maximum of 19 pairs/calling male upland sandpipers were found across the state in 2012, most of them on or close to reclaimed surface mines. However, locating such a scarce species can be problematic, and it is still not known to what extent the species is under-reported. To help direct future surveys we analyzed data from the 2nd PBBA and the 2012 survey to produce a habitat suitability model for the upland sandpiper in Pennsylvania. We used a GIS framework to determine areas of suitable habitat and then stratified these by proximity to recent (2004-2012) upland sandpiper sightings. We recommend that our suitability model be used to establish a sampling protocol for more thorough statewide upland sandpiper survey every five years, in order that the species' precarious status can be closely monitored.

Keywords
endangered species, birdwatcher, sandpiper, habitat conservation

Disciplines
Environmental Monitoring | Environmental Sciences | Poultry or Avian Science

Comments
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INTRODUCTION

Upland Sandpiper, Somerset Co. PA, May 2012 (A. Wilson)

The Upland Sandpiper (*Bartramia longicauda*) is a migratory shorebird that travels from pampas wintering grounds in South America to breeding grounds in the United States and Canada (Houston & Bowen 2001). Within the last few decades populations have declined in the eastern United States (Sauer et al. 2011), due to the loss of suitable habitat in both its breeding and wintering grounds (Houston & Bowen 2001; Vickery et al. 2010). In Pennsylvania there have been minimal conservation efforts for this species as little is known about the species' habitat requirements in the eastern United States. Therefore, known suitability requirements for this species in areas such as the Upper Great Plains can be adapted to create habitat suitability indices for regions such as Pennsylvania (Ailes, 1980; Vickery et al. 2010). In Pennsylvania it was found in less than 0.5% of atlas blocks during the *Second Atlas of Breeding Birds in Pennsylvania* project (2nd PBBA; 2004-09) and breeding was confirmed at only two locations (Wilhelm 2012). Due to continued declines and a small population size, the Upland Sandpiper was listed as PA endangered in 2012.

Aims

Because many 2nd PBBA records of this species were of birds on single dates, it remains difficult to ascertain the status of this species. It is not known, for example, how many of the atlas records related to birds in established territories. Further, due to the species' scarcity, and the fact that many recent records were from reclaimed surface mines, which may not be readily accessed by birdwatchers, it is not known to what extent the 2nd PBBA might have under-reported this species.

In 2012 we conducted follow up surveys of 2nd PBBA Upland Sandpiper sightings with the aim of piloting field survey protocols and designing a sampling strategy that could be employed to carry-out a more complete survey of this species.

FIELD SURVEYS

Methods

From May 14th-25th, 2012, 17 atlas blocks that had "confirmed" or "probable" breeding Upland Sandpipers in 2nd PBBA were resurveyed by Gettysburg College students and volunteer birdwatchers. The searches were stratified within four concentric 1 km circles around each PBBA sighting. Up to 10 locations within 4 km of the atlas records were surveyed. A five-minute point count survey was conducted with audio playback during the second and fourth minutes (Fig. 1). Surveys were conducted during morning hours (5:30-10am). The survey period coincided with territory establishment, when birds were most detectable, but late enough to avoid inclusion of passage migrants (P. Vickery, pers. comm.). Point counts were near quiet township roads or off road, away from significant noise disturbances.

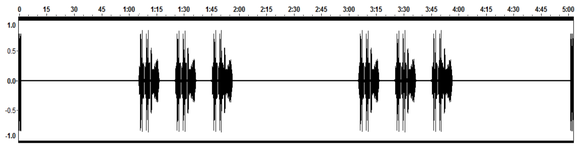

Figure 1. *Sonogram of audio playback mp3 developed to improve Upland Sandpiper detection.*

Results & Discussion

A maximum of nineteen singing males/pairs of Upland Sandpipers were located in Pennsylvania in 2012. This represents a higher total than in any one 2nd PBBA year, and is likely the highest statewide total reported in any one year since at least the mid 1980s.

Audio playbacks were conducted at 126 locations in 17 atlas blocks and proved to be successful in locating Upland Sandpipers. Most responses to the playback were within the first two minutes of the initial playback. Upland Sandpipers were located at 13 (10.4%) of audio playback locations, which may include some duplication of birds. Due to the high success rate of locating birds at 2nd PBBA locations, and the fact that our surveys indicate continued presence of the birds 3-8 years after the initial 2nd PBBA sighting, we conclude that these are established breeding pairs or small populations.

We estimate that there are likely 15-50 breeding pairs of Upland Sandpipers in PA. Five of the pairs were located on state game lands but the majority were on private land. Four of these sites contained two to four pairs. Our surveys confirmed the importance of reclaimed surface mines – all but two occupied sites were on or close to reclaimed surface mine grasslands.

GIS ANALYSIS

Methods

The aims of our GIS analysis were to determine areas of potential Upland Sandpiper habitat using a habitat suitability index (HSI), and to devise a sampling strategy to allow targeted future surveys.

The habitat suitability index was comprised of four variables which were based on 2nd PBBA and 2012 survey data, and were calculated in ArcMap 10:

- land cover type [1] (farmland and grassland = 1, other = 0)
- distance to forest [1] (<50m = 0, 50-150m = 0.5, >150m = 1)
- elevation [2] (<150m = 0, 150-750m = 1, >750m = 0.5)
- distance to reclaimed mine [3] (>5km = 0.5, 5km to 0 = 0.75, 0 =1)

The final index was derived by multiplying the 4 variables (Fig. 2). Areas of HSI ≥ 0.5 are deemed of moderate potential Upland Sandpiper habitat (henceforth HSI_M), areas of HSI ≥ 0.75 (HSI_H) are high potential habitat in reclaimed surface mine areas. Contiguous areas smaller than 50 ha were excluded because the Upland Sandpiper is area-sensitive (Houston & Bowen 2001). The area of HSI_H (count of 30x30 m cells) was then summed across each atlas block (c.25 km^2) to derive three strata to be used to direct future survey effort:

Strata	*Area of HSI_H*	*Sampling strategy*
1	< 1111 (1km^2)	No surveys
2	1111-4444 (1-4km^2)	Random sample
3	> 4444 (4km^2)	Survey all blocks

Blocks where birds were observed in 2012 surveys or where "probable" or "confirmed" breeding were reported in 2nd PBBA were added to Strata 3. Blocks where there was "possible" breeding in 2nd PBBA were added to Strata 2.

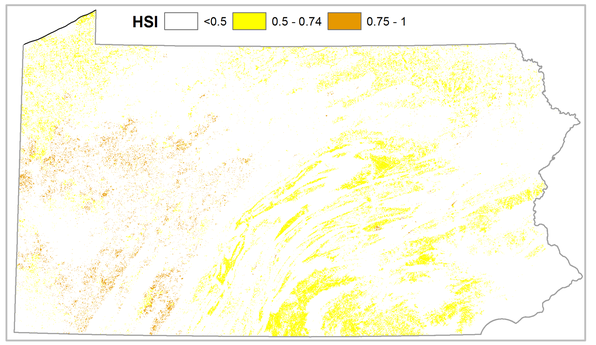

Figure 2. *Habitat Suitability Index for the Upland Sandpiper in PA*

Results & Discussion

Because our HSI is weighted towards areas with reclaimed surface mines, we determine that most of the potential habitat for the Upland Sandpiper is in the western half of PA (Fig. 2). Our sampling design classifies 52 atlas blocks in Strata 3 and a further 326 in Strata 2 (Fig. 3).

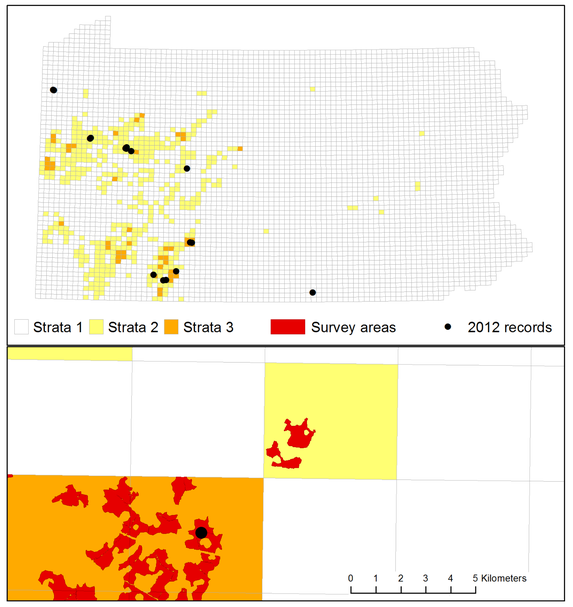

Figure 3. *Sampling design for Upland Sandpiper surveys based on PBBA blocks (top) and a group of blocks with survey areas (HSI_M + HSI_H), bottom.*

RECOMMENDATIONS

We recommend that to better ascertain the status of the Upland Sandpiper in PA, more comprehensive audio playback surveys should be conducted. Surveys should include all potential habitat within the 52 blocks in Strata 3 and a random sample (e.g. 10% of blocks) in Strata 2 (Fig. 3). Such surveys could be a completed by a combination of citizen scientists and professional fieldworkers, and should be repeated every five years to monitor Upland Sandpiper population changes.

The Upland Sandpiper will likely continue to decline in PA unless targeted management is enacted. Our surveys highlight areas that should be managed to retain favorable habitat and nesting conditions for this species.

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Data sources

(see GIS Analysis – Methods) , from http://www.pasda.psu.edu

1 National Land Cover (NLCD) for Pennsylvania (2006)

2 Digital elevation Model: U.S. Geological Survey and Shuttle Radar Topography Mission (2010)

3 Surface Mine Data of Pennsylvania; Pennsylvania Spatial Data Access (2003)

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