Monitoring Plan: The Effect of Land Management on Seed-Eating Passerine Species

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Executive Summary

Currently, North American landbird populations are undergoing declines. This is leading to a loss of biodiversity in many areas of North America. Some factors that pose a threat to landbirds are domestic cats, habitat loss, window strikes, and the use of pesticides (Landbird article). In order to take a closer look into this issue, our monitoring team decided to focus on the assessment of seed-eating passerine species at Jones Nature Preserve, located in Rappahannock County, Virginia. Specifically, the team was interested in learning how land management practices may alter seed-eating bird habitat preferences.

The team surveyed birds from two habitats located in Jones Nature Preserve. The first habitat was a warm season native grass (WSG) plot that is managed through burning. The second habitat was a Conservation Reserve Enhancement Program (CREP) area that has been left unmanaged. The CREP habitat was established naturally in hopes to restore a riparian area where cattle used to roam. Team members marked off 30m by 60m plots in each habitat from which they surveyed seed-eating passerines from. They walked along a single transect line in the middle of the plots containing 6 observation points. While surveying for birds they collected data on whether birds were flying over, foraging, or simply landing in the plots.

The preliminary results of this monitoring plan suggest that both the CREP and the WSG plots are equally capable of attracting seed-eating passerine species. However, the CREP plot did attract more birds than the WSG plot, but there was no significant difference (185 v. 151).

As for future work involving seed-eating passerine species, the team has five goals that they would like to achieve in the future. These goals include refinement of sampling techniques where they plan to increase observer training. Continued surveying in the original plots (bird

monitoring weekly and plant surveying monthly) will take place so that they may gain more data. New demonstration plots will be constructed to act as visual aids for the stakeholders. It should make it easier for the stakeholder to see the differences in vegetation and birds better. The team plans to engage with public outreach through workshops about bird identification and land management practices. Finally, the team intends on creating a website to share the results with stakeholders, promote networking, and provide information on workshop dates.

Introduction

The Jones Nature Preserve is privately owned by Bruce and Susan Jones and is located in Rappahannock County, Virginia. In the 1980s, the couple first purchased 75 acres of land that was originally used for cattle grazing with the original smaller-scale goal of creating habitat for birds. Now, twenty years later, the Jones Nature Preserve spans 150 acres, and has expanded its goals to include the preservation of hardwood forests, warm season grass meadows, wetlands, and other habitat types that are conducive to fostering native plant growth and encouraging biodiversity (Jones Nature Preserve-Virginia Working Landscapes). The Jones Nature Preserve has made many conservation efforts, such as building bird boxes, expanding habitats, re-planting native plant species, and engaging in the CREP and Wildlife Habitat Incentive Program (WHIP) incentive programs (Jones Nature Preserve, 2014). It has also offered activities such as pollinator walks to help educate and interact with the local community in a conservation-minded setting (Pollinator Walk).

Our monitoring project focuses on seed-eating birds found within Jones Nature Preserve such as goldfinches, cardinals, house finches, starlings and cowbirds. The habitats that we intend to focus on are two meadows within the nature preserve. One meadow is composed of native warm season grasses, while the other meadow is composed of some of the flora encouraged by the Conservation Reserve Enhancement Program. Commonly referred to as CREP, this program is controlled by the Farm Service Agency (FSA) within the United States Department of Agriculture (USDA). It focuses on "high-priority conservation issues" and annually gives money back to landowners in exchange for converting land formerly used for production into areas managed for conservation purposes (United States Department of Agriculture). In 2004, the Jones Nature Preserve converted land for cattle use into riparian buffer zones (Jones Nature

Preserve, 2014), which are essential to filtering polluted air, providing canopy shading, improving the microclimate in adjacent fields, creating new habitats in land or inland water ecosystems, and creating more "landscape bridges" between migration corridors (Mander et al., 1997).

Passerines are a diverse group of birds in the order Passeriformes. Passerine surveys are often used to evaluate habitat diversity and ecosystem health within an area for many reasons. Many passerine species have relatively short life spans and are sensitive to human environmental impacts making them good indicator species (Gregory et al. 2010). We chose to evaluate seed-eating passerines in particular because of the season of the project. During the fall months most passerine species that breed in the Mid-Atlantic region migrate south; however, many seed-eating passerines remain consistently abundant in the region throughout the winter months. This ensures an abundance and variety of species to survey.

Seed-eating birds are important to various ecosystem functions, including but not limited to dispersing plant seeds (McAtee, 1947), managing agricultural pests (Kirk et al., 1996), and contributing to human recreation through activities such as bird watching and hunting (Whelan et al., 2008). According to the UN Millennium Ecosystem Assessment, birds are recognized for their contribution to four types of services: provisioning (clean water & production of fiber), regulating (carcass consumption), cultural (recreation & aesthetics), and supporting services (nutrient cycling & biomass production) (Whelan et al., 2008). By measuring the number of species found in various meadows in the Jones Nature Preserve, we can evaluate the level of biodiversity of an area; through these surveys we can subsequently deduce which habitat composition is most beneficial to the greatest number of bird species, and which areas could be improved to promote diversity.

Our research question is: what is the relationship between meadow composition and the presence and abundance of seed-eating passerines at Jones Nature Preserve? In this project, we record the presence, abundance and behavior (landing, foraging, or fly-overs) of seed-eating birds in both a warm season grass area and a CREP area on the reserve. The warm season grass habitat was deliberately planted with native flora, and it contains Indian grass, Maximilian sunflowers and big bluestem (Bruce Jones, personal communication). Maximilian sunflowers are currently seeding, which we hypothesize will make this a beneficial habitat for seed-eating passerines. On the other hand, the CREP habitat was not deliberately planted, and it contains flora that naturally grew in the area over time, such as trees, shrubs, grass species, and other plants like goldenrod and blackberry thickets. There are also invasive species in this area such as honeysuckle. We hypothesize that because there is a more diverse array of plants in this area, it will benefit seed-eating passerines in the form of providing nesting areas and food sources (B. Jones, personal communication, October 8, 2015). We intend to see a difference in habitat use among seed-eating passerines at Jones Nature Preserve.

Hopefully, the answers that we find to this question can be applied not only to the current project, but also to areas of interest held by our stakeholders, imparting a lasting significance to the information we discover. Bruce and Susan Jones are our primary stakeholders because they are the landowners of the preserve and may benefit from the presence of birds that are attracted to their diverse habitats. Our secondary stakeholders in the project include but are not limited to the Audubon Society, landowners, farmers, bird enthusiasts, nature lovers, and hunters, all of which may learn valuable information about biodiversity and the correlation between field composition and seed-eating bird populations.

Preliminary Work: Methods

Seed-eating bird surveying took place at Jones Nature Preserve, located off of Lee highway in Rappahannock County, Virginia. Surveying was conducted on Oct. 15 and 22, 2015 from 7am to 11am. We surveyed in two plots of land that were located between Quail Corner and the Ridgeline and next to Tiger Valley Road (Figure 1).

The first survey plot consisted of native warm season grasses (WSG) and the second plot was located in a Conservation Reserve Enhancement Program (CREP) field surrounding a pond where cattle used to roam. The native warm season grass plot, managed through burning, had Maximillian sunflowers, turkey foot, Indian grass, and goldenrod that were an average height of 6.5 feet. The second sampling area, the CREP plot, was left unmanaged and consisted of a few small trees, poke berry, goldenrod, blackberry, shrubs, and honeysuckle which were at an average height of 3.5 feet.

Before our first day of surveying, each of the two plots were marked off with flags using measuring tapes. Both of the sample plots were 30m by 30m. On each surveying day we made sure to wear bland colored clothing that allowed for better camouflage with our surroundings so that we didn't scare any birds away while monitoring. On the first day of surveying we walked along two transect lines (30m each) that were marked at 10m and 20m. Each transect line had 3 markers at 5m, 15m, and 25m where we surveyed for 15 minutes at each marker (6 total markers). Between each survey we waited 3 minutes before we started our next survey in case we startled any birds. The surveying radius was estimated to be about 30m at each marker.

On the second surveying day we altered our transect lines. Instead of surveying birds from both transect lines, we decided to use only one transect line per plot at 15 m. We extended this transect, along with the side of our sample plot by adding on 3 more markers and 30 extra meters. Our two new plots were 30m by 60m. We surveyed at 5m, 15m, 25m, 35m, 45m, and 55m along the new transect line. This alteration was made to ensure that we wouldn't be inadvertently recording the same birds. Again, we spent 15 minutes of surveying at each marker with a 3 minute break between surveys. Our surveying radius was about 30m on this day too.

We focused on surveying specific members of the seed-eating passerine group: house finches, American goldfinches, eastern meadowlarks, and northern cardinals. We had expected to see the most of these while out in the field. All other seed-eating passerines were included in the data for species richness purposes. We observed some nondescript, brownish birds within the family Emberizidae (sparrows and relatives) and they were included as well. In case we were unable to identify a specific Emberizidae, we placed these individuals into a data category of "ambiguous Emberizidae".

We used the Point Count method to survey the birds on both days. Two students surveyed at one plot while the other two students surveyed simultaneously at the other plot (7-11 am). To reduce bias, the groups switched plots on the second survey day. At each plot there was one student that observed the birds while the second student recorded the data on a clipboard and helped with identification. Birds were identified using a bird identification guide and print out of common seed-eating birds. Binoculars were used for better viewing of the birds. We recorded which bird species were observed and in what numbers. We also recorded the time at which each bird was observed. If the bird was traveling in a group, the number of individuals were also recorded. Behavioral data were classified into one of three groups: *fly-over, landed,* or *foraging*.

If the individual flew within sight of the observer, but did not land in the sample plot it was classified as a *fly-over*. If an individual landed in the plot and was not seen eating then it was classified as *landed*. The classification *foraging* was used to convey that the individual landed in the habitat and was observed feeding. Additional information such as noise disturbances were recorded in the notes section of our data sheets. After we completed surveying we removed the flagging tape that marked our transect lines and plot boundaries.

Species richness and relative abundance of the species observed were determined for each habitat. The Simpson's Diversity Index was used to calculate species richness and relative abundance (or evenness). It was 8 for the CREP plot and 7 WSG plot. Habitat use by the birds was compared between the two plots. Our findings from this method of data collection will be compared with the existing information collected from past surveys of plant and bird species on the property (have yet to be obtained).

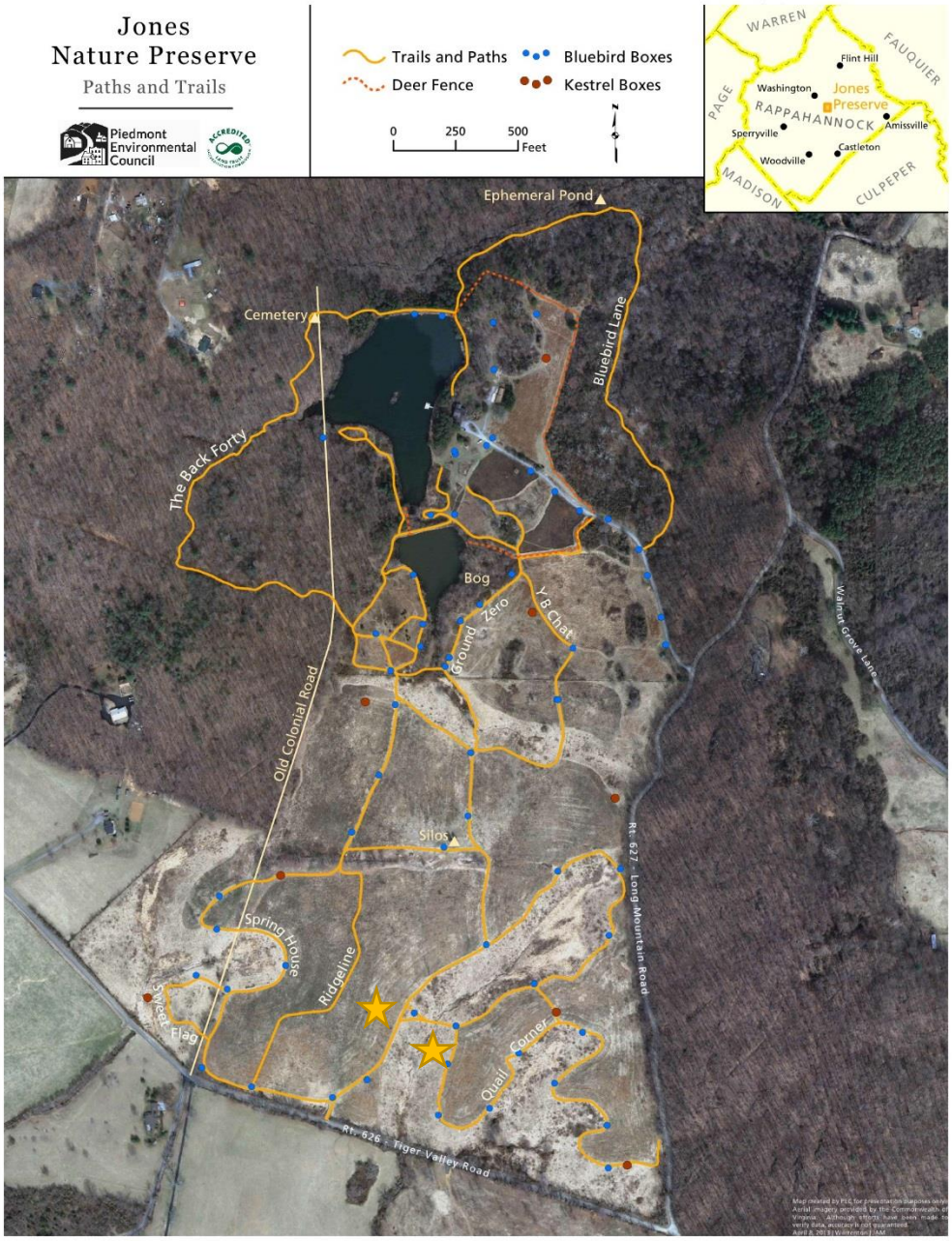

Figure 1. Map of Jones Nature Reserve. Yellow stars indicate where our sampling plots were located. The star on the left is the warm season grass plot and the star on the right is the CREP plot.

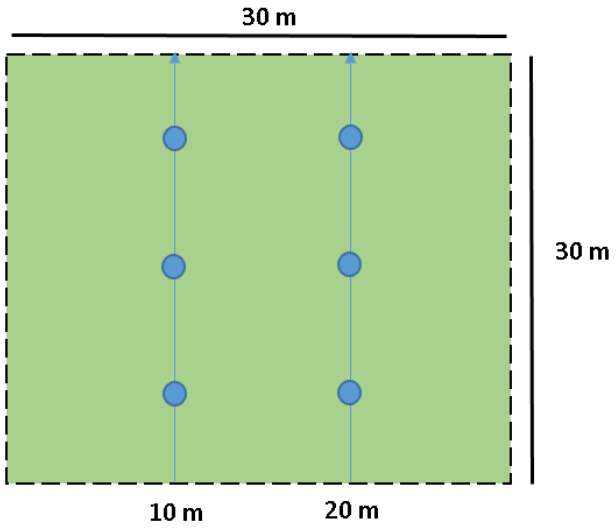

Figure 2. Original plot set up at Jones Nature Preserve. Blue circles indicate observation points.

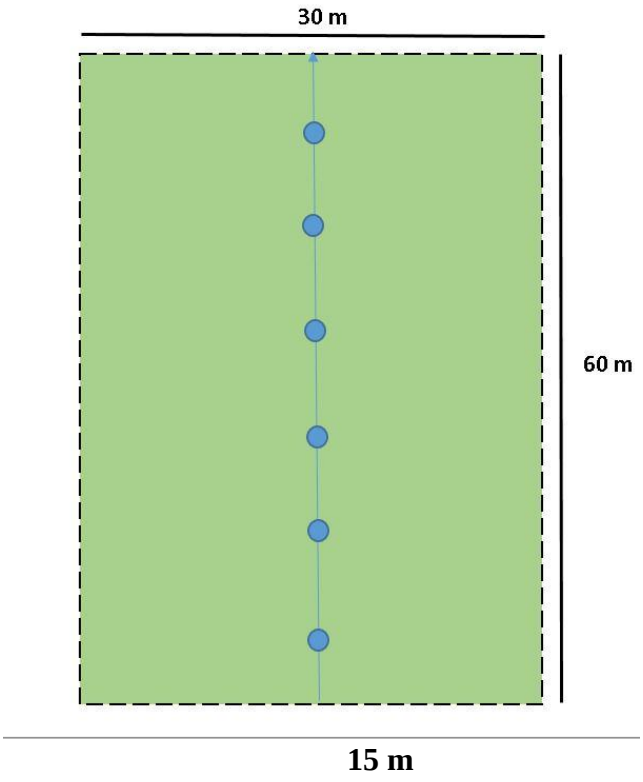

Figure 3. New plot set up at Jones Nature Preserve. Blue circles indicate observation points.

Preliminary Work: Results

Table 1. Seed-eating passerine species observed among a CREP plot and a warm season grass plot at Jones Nature Preserve (for abbreviation reference).

Seed-eating Passerine Species Observed	
AMGO	American Goldfinch (*Spinus tristis*)
CACH	Carolina Chickadee (*Poecile carolinensis*)
EAME	Eastern Meadowlark (*Sturnella magna*)
EATO	Eastern Towhee (*Pipilo erythrophthalmus*)
EUST	European Starling (*Sturnus vulgaris*)
FISP	Field Sparrow (*Spizella pusilla*)
INBU	Indigo Bunting (*Passerina cyanea*)
RWBL	Red-winged Blackbird (*Agelaius phoeniceus*)
SOSP	Song Sparrow (*Melospiza melodia*)
WCSP	White-crowned Sparrow (*Zonotrichia leucophrys*)
WTSP	White-throated Sparrow (*Zonotrichia albicollis*)

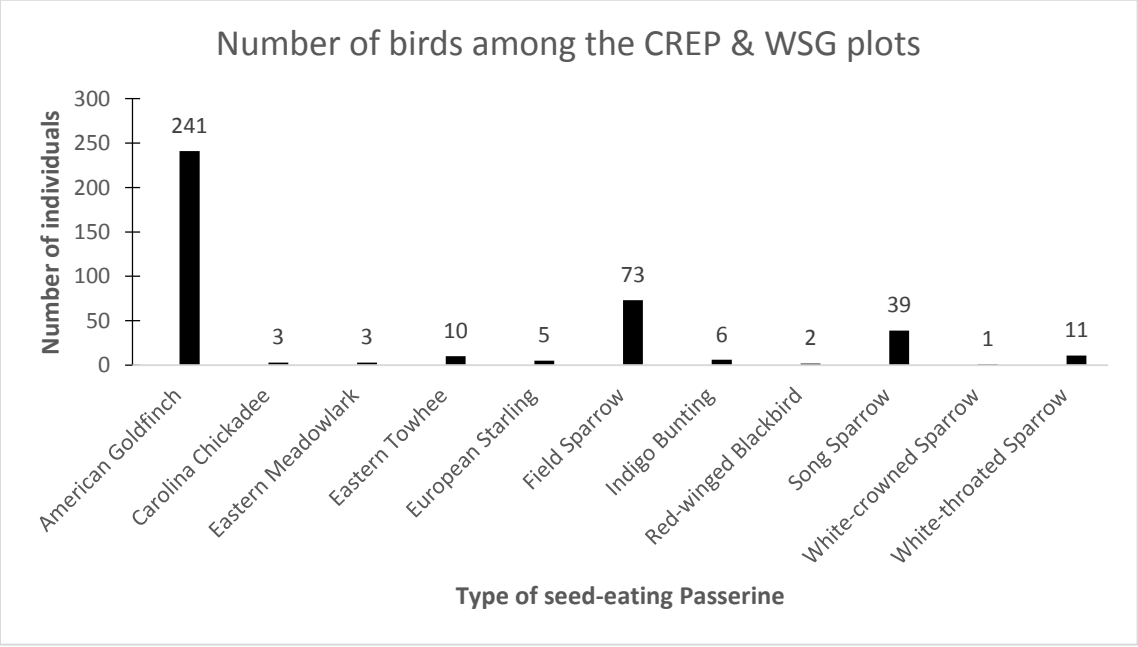

Figure 4. Number of individual seed-eating passerines observed at the Jones Nature Preserve. Birds were observed using the point count method at a CREP habitat plot and a warm season grass (WSG) plot that were of equal size. Data are the combination of three behaviors: flyovers, landings, and foraging.

While surveying for seed-eating passerine species at Jones Nature Preserve, a total of 11 bird species were observed in both the Conservation Reserve Enhancement Program CREP plot and the warm season grass (WSG) plot (Table 1). The top three bird species observed among the plots were American goldfinches (241), field sparrows (73), and song sparrows (39) (Figure 4). Out of the 11 recorded birds that were seen, the white-crowned sparrow was only observed once (Figure 4).

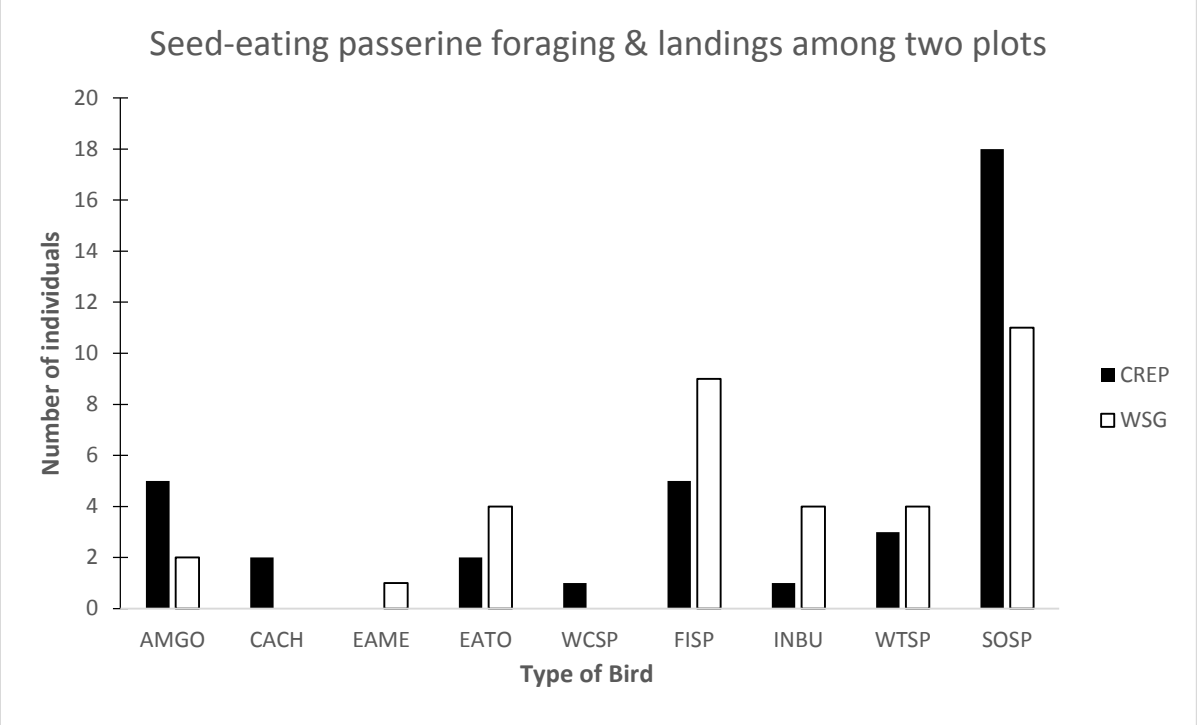

Figure 5. Number of seed-eating Passerines observed in the CREP plot and the warm season grass (WSG) plot located at Jones Nature Preserve. Data are the combination of two behaviors: landing and foraging. Birds were observed using the point count method. Refer to table 1 for bird abbreviations.

During landing and foraging observations, more song sparrows were observed in the CREP plot than in the warm season grass plot (Figure 5). We did not observe any landing or foraging behavior from Carolina chickadee or the white-crowned sparrow in the warm season

grass plot (Figure 5). The same was true for the eastern meadowlark in the CREP plot (Figure 5). Song sparrows were observed landing and foraging the most (N=18) among all bird species recorded from both plots (Figure 5).

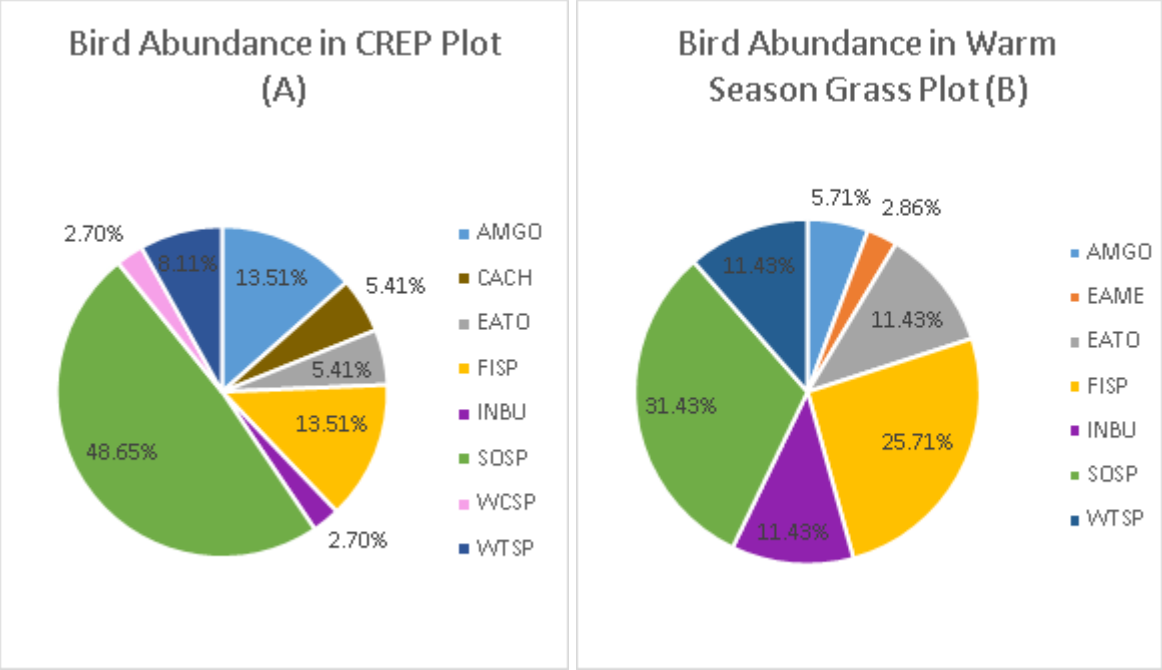

Figure 6. The abundance of seed-eating Passerine species within the CREP plot and the warm season grass plot. Birds were observed using the point count method. Data are the combination of two behaviors: landing and foraging. Refer to table 1 for bird abbreviations.

Of the birds observed in the CREP plot, the most abundant bird was the song sparrow at 48.65% (Figure 6A). The CREP plot was made up of 8.11% of white-throated sparrows which were not observed in the warm season grass plot (Figure 6). The least abundant species tied at 2.70% and they were the white-crowned sparrow and indigo bunting (Figure 6A). Of the birds observed in the warm season grass plot, the most abundant bird was the song sparrow at 31.43% and the least abundant was the eastern meadowlark at 2.86% (Figure 6B). Field sparrows observed at the CREP plot (13.51%) were less abundant than those seen at the warm season

grass plot (25.71%) (Figure 6). There were an equal abundance of eastern towhee and white-throated sparrows in the warm season grass plot at 11.43% each (Figure 6B).

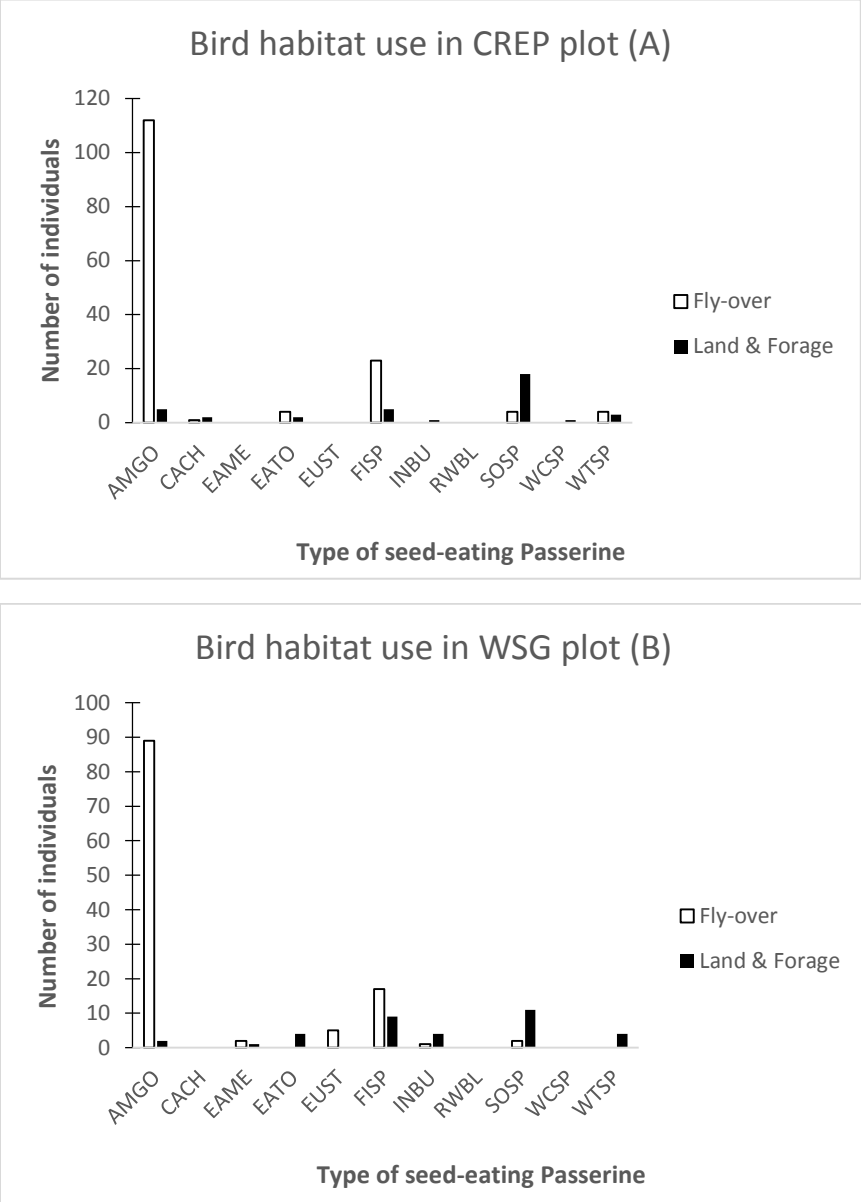

Figure 7. Habitat use of seed-eating Passerines that were observed flying over or foraging and landing at the CREPS plot (A) or the WSG plot (B). Birds were observed using the point count method. Refer to table 1 for bird abbreviations.

When comparing habitat use both figures show many more American goldfinches flying over both plots rather than landing and foraging (Figure 7). There were 148 total fly-overs in the CREP plot and 116 in the WSG plot (Figure 7). Overall, more birds were observed at the CREP plot (Figure 7). We observed 37 individual birds at the CREP plot and 35 at the WSG plot. Using the Simpson's Diversity Index, we calculated that the species richness of the CREP plot was 8 and the WSG plot was 7. Simpson's Diversity Index calculated 81.5 for our CREP plot and 73.1 for our WSG plot. The value for the CREP plot is somewhat higher than the value of the WSG plot.

Action Plan

Goal 1. Determine the most suitable habitat for seed-eating birds:

The main goal of our monitoring project is to assess the abundance of seed-eating birds among two different habitat plots at Jones Nature Reserve. Our preliminary results suggest that the Conservation Reserve Enhancement Program (CREP) plot attracts more birds directly (land and forage) than the warm season native grass plot (WSG), their values being 37 and 35 respectively. This difference is small so I would suggest to our stakeholders (landowners, farmers, & Bruce Jones) that it would be better to plant vegetation similar to that of both plots to attract more birds. Since Bruce Jones wants to increase the number of seed-eating birds on his property, it would be important to assess which habitats are attracting the most of those types of birds. More birds spent their time flying over the plots rather than landing and foraging. Overall, the CREP plot had more bird sightings (185 vs. 151). The time of year when we surveyed may have impacted the number of birds that we saw due to migration patterns or if plants were sparse because they were in the process of dying back for the winter (Robinson et al., 2004). More data should be collected on the biodiversity of birds before any plans are initiated. Success of increasing bird biodiversity among plots may be measured through further surveying on the property using the point count method. We would like to continue surveying the property for birds every year.

Goal 2. Increase ecological stewardship of land:

When Bruce Jones originally purchased his land, his goal was to increase awareness of ecological stewardship of land (Bruce Jones Nature Preserve). He manages his land with the intention of attracting wildlife and doing so through planting native vegetation. During our two days surveying we observed almost 400 birds in total between the two plots. This result is a fairly high number considering that we were surveying from a small portion of the Jones' land.

We would like to compare our values to past bird surveying values so we can assess how much impact he has had on bird biodiversity. We hope that we can show that through his management practices he has increased bird biodiversity and can act as an example to other stakeholder landowners and farmers who may be interested in ecological stewardship as well. If farmers aren't aware of what ecological stewardship is, data from surveys on his property may be altered in such a way that suggests managing land sustainably is more cost effective because birds may attract pollinators so then crops will flourish more. All people should strive to manage land sustainably, especially since people are destroying natural vegetation and decreasing biodiversity with problems like monoculture farming. To measure the success of increased ecological stewardship we can hold tours where people can visit the preserve just as our class did when we first visited it. It shouldn't take any longer than a week after our class presentation to set up tours which would last 1-2 hours each. It would allow the public and any potential stakeholders to see how the Jones' management techniques have positively impacted the surrounding environment. We could keep a record of how many people attend the tours and email anyone who is considering managing their land in similar ways. Once people begin to do this we can partner with Virginia Working Landscapes or biologists who can visit these people's lands and assess them for biodiversity and for using sustainable practices.

Goal 3. Demonstration Plots:

To better understand which habitats attract more seed-eating birds it would be interesting to set up three demonstration plots: a warm season native grass plot, a CREP plot, and a control plot. This way all plots would have the same amount of time to establish themselves, we could control the size of each plot, and there would be less impact from neighboring field compositions that may be influencing the distribution of birds at the Jones Nature Preserve. This would create

a better design to survey from because we could construct them just as Virginia Working Landscapes did with their demonstration plots at SCBI. The only problem with this is that it may require some time for the plots to establish themselves before we could survey them for birds. If we did this then our stakeholders may gain a better understanding of the differences in vegetation and bird types between the plots better than they would if we took them to Jones Nature Preserve where the plots are so close to each other. Since we surveyed from plots that weren't controlled and that were parts of larger meadows that were combined with different mixtures of vegetation it would be hard to show the differences between plots. However, if the plots were controlled and separated, it would be easier to show the individual differences between the plots. It would be nice to separate the plots completely from each other so that the distance will hopefully deter birds that are hopping back and forth between plots. We would collaborate with VWL so that we could decide on the best location to set up the plots, use their equipment, and gain extra hands on the project. In return, VWL would have a new set of demonstration plots that they could use to promote to landowners. Success of biodiversity will still be measured through bird surveying, which will be required four times a year once the plots reach maturity to take migration patterns into account (about 2 years).

Goal 4. Funding for Demonstration plots:

We would like to plan on continuing our monitoring project through the visual aid of demonstration plots for our stakeholders. Visual aids are important in conveying ideas to people like our stakeholders because it will make it easier for them to understand the differences in vegetation and bird species between the plots. We want to make it easy for them to understand how to manage their land if they are interested in attracting more seed-eating birds because the birds may aid in ecosystem services on their property. In order to create these demonstration

plots we will need to find funding to start the project. It's important to find someone to invest in this project because it will also help with advertisement of our findings. If stakeholders wish to contribute through the donation of seeds it would save us on finding funding for vegetation. If it becomes difficult to find funding for the purchase of land, then we may need to apply for a grant. If we could find a patch of farmland that is in need of CREP restoration we may be able to apply for money that way. We cannot establish a CREP plot on cropland that isn't eroding or in some proximity to water (Natural Resources Conservation Service). This is because CREP land is normally restored through the program after it has been used for raising cattle. This goal will be reached once we are able to find funding for the land and supplies (1 yr), can give it time to grow (2 additional yrs), and then hopefully attract stakeholders the following year to come visit the plots and learn about the management techniques that will help them attract more seed-eating birds.

Goal 5. To make results available to the public:

As part of our communication strategy we want to present our data in an effective way so that it's accessible to the public. For this reason, we have chosen to put together a website with our findings and suggestions on best land management practices for attracting seed-eating birds. This accessibility to our data is important because if stakeholders are interested in attracting more birds to their properties they can simply look at the website instead of directly contacting Bruce Jones. Placing this information on a website may also be helpful if future studies are conducted on birds at the preserve. This way researchers can pull our data directly off the website and use it to compare to their own data. We plan on having our website up and available to the public within the next few weeks. We can then track how many views our website receives and how many people pull up our bird data on the website.

Resources, Budget, & Timeline

Seed-Eating Birds Action Plan Estimated Expenses
Fiscal Year: 2016

Category	**Activity**	**Units**	**Cost**
Personnel	Tours & Sampling	4 part-time individuals (~30 hours/ week)	**$63,000**
	Website Management	1 part-time individual (~5 hours/ week)	**$3,000**
	Planting (for demonstration plots)	1 part-time individual (~20 hours/ week)	**$11,000**
Goods	Native Sunflower Seeds (for plots)	25 lbs	**$1,500**
	Native Grass Seeds (for plots)	50 lbs	**$3,000**
Goods	Land (if not donated) (for plots)	4 WSG Plots	**$2000** ($500 per plot)
		4 CREP Plots	**$0** through the Farm Service Agency CREP program
Goods	Web Domain Name	One-time payment	**$50**
	Total		**$83,550**

Fiscal Year 2017

Category	Activity	Units	Cost
Personnel	Tours & Sampling	4 part-time individuals (~30 hours/ week)	**$63,000**
	Website Management	1 part-time individual (~5 hours/ week)	**$3,000**
Goods	Land (if not donated & same from 2016)	4 WSG plots	**$2000** ($500 per plot)
	Land (if not donated & same from 2016)	4 CREP plots	**$0** through the Farm Service Agency CREP program
	Total		**$68,000**

Fiscal Year 2018

Category	Activity	Units	Cost
Personnel	Tours & Sampling	4 part-time individuals (~30 hours/ week)	**$63,000**
	Website Management	1 part-time individual (~5 hours/ week)	**$3,000**
Goods	Land (if not donated & same from 2016)	4 WSG plots	**$2000** ($500 per plot)
	Land (if not donated & same from 2016)	4 CREP plots	**$0** through the Farm Service Agency CREP program
	Total		**$68,000**

Activities for the Future: Timeline

2016:

- January: Presentation of our final initial findings to Bruce Jones.
    - Continued once-weekly surveys of seed-eating passerines in original WEC and CREP plots.
    - Establishment of a website.
    - Construction of new demonstration plots.
        - 4 of each plot type: total of 8 plots.
- Year-round: Continued maintenance of the website, with updates posted monthly.
    - Continued construction of new demonstration plots.
    - Continued once-weekly surveys of seed-eating passerines in original WEC and CREP plots and analysis of results.

2017:

- June: Host open-to-public workshop, demonstrating relationships between field composition and passerine presence. Family style event that can also get kids engaged and interested, allowing people to tour the demonstration plots. Intent will be to host two workshops annually.
- September: Host open-to-public workshop, demonstrating relationships between field composition and passerine presence. Family style event that can also get kids engaged and interested, allowing people to tour the demonstration plots. Intent will be to host two workshops annually
- Year-round:
    - Continued maintenance of the website, with updates posted monthly.
    - Demonstrations plots completed; begin weekly seed-eating passerine monitoring surveys at the demonstration plots, collecting further data on species presence and analyzing results.
    - Begin monthly plant monitoring surveys at demonstration plots, collecting further data on species presence, creating a species list and analyzing results.
    - Begin promoting to private landowners and general public findings and new results as received.

2018:

- June: Host second annual workshop, open-to-public, demonstrating relationships between field composition and passerine presence. Family style event that can also get kids engaged and interested, allowing people to tour the demonstration plots.
- September: Host second annual workshop, open-to-public, demonstrating relationships between field composition and passerine presence. Family style event that can also get kids engaged and interested, allowing people to tour the demonstration plots.
- Year-round:
    - Continued maintenance of the website, with updates posted monthly.
    - Continue weekly seed-eating passerine monitoring surveys at the demonstration plots, collecting further data on species presence, updating the species list and analyzing results.
    - Continue monthly plant monitoring surveys at demonstration plots, collecting further data on species presence, updating the species list and analyzing results.

- Continue promoting to private landowners and general public findings and new results as received. Occasionally host meetings to present findings to relevant groups.

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Natural Resources Conservation Service. (n.d.). Retrieved November 20, 2015, from http://www.nrcs.usda.gov/wps/portal/nrcs/detail/md/programs/?cid=nrcs144p2_025631# What Lands are Eligible for Enrollment in CREP

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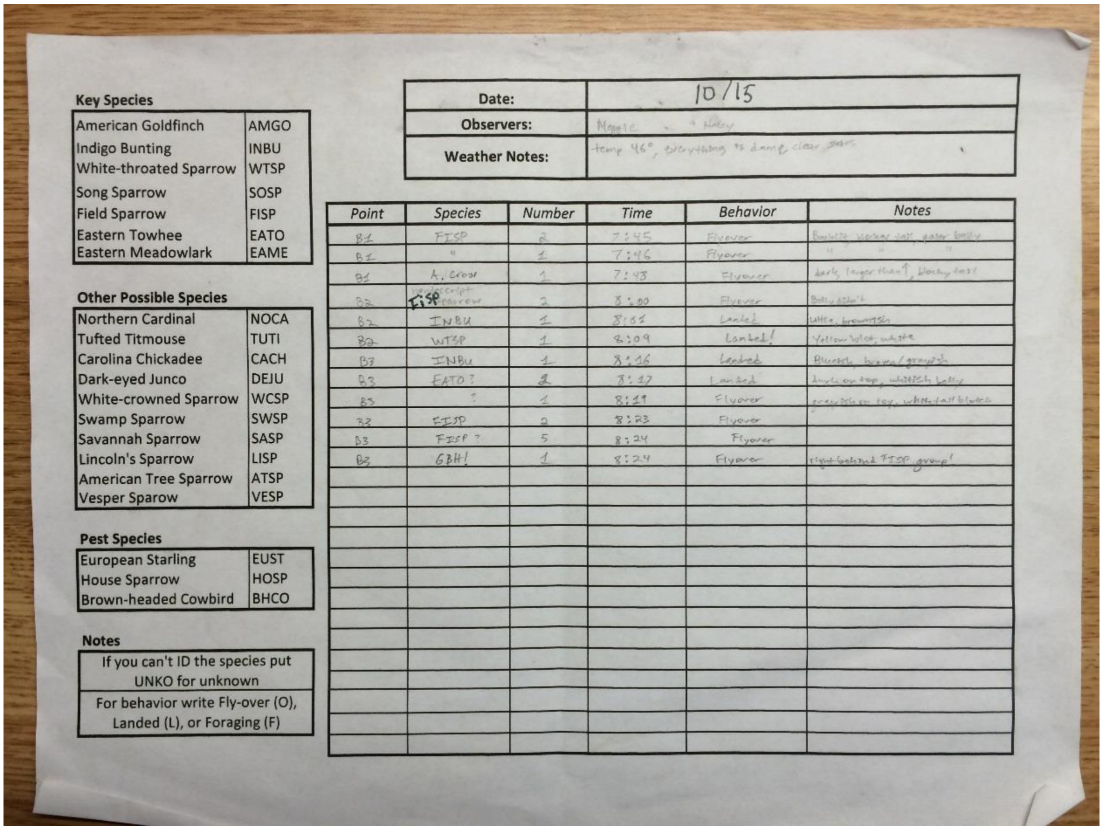
Appendices

Appendix I: Raw Data Collected on 10/15/15 from Both Plots (WSG and then CREP)



Key Species

American Goldfinch	AMGO
Indigo Bunting	INBU
White-throated Sparrow	WTSP
Song Sparrow	SOSP
Field Sparrow	FISP
Eastern Towhee	EATO
Eastern Meadowlark	EAME

Other Possible Species

Northern Cardinal	NOCA
Tufted Titmouse	TUTI
Carolina Chickadee	CACH
Dark-eyed Junco	DEJU
White-crowned Sparrow	WCSP
Swamp Sparrow	SWSP
Savannah Sparrow	SASP
Lincoln's Sparrow	LISP
American Tree Sparrow	ATSP
Vesper Sparrow	VESP

Pest Species

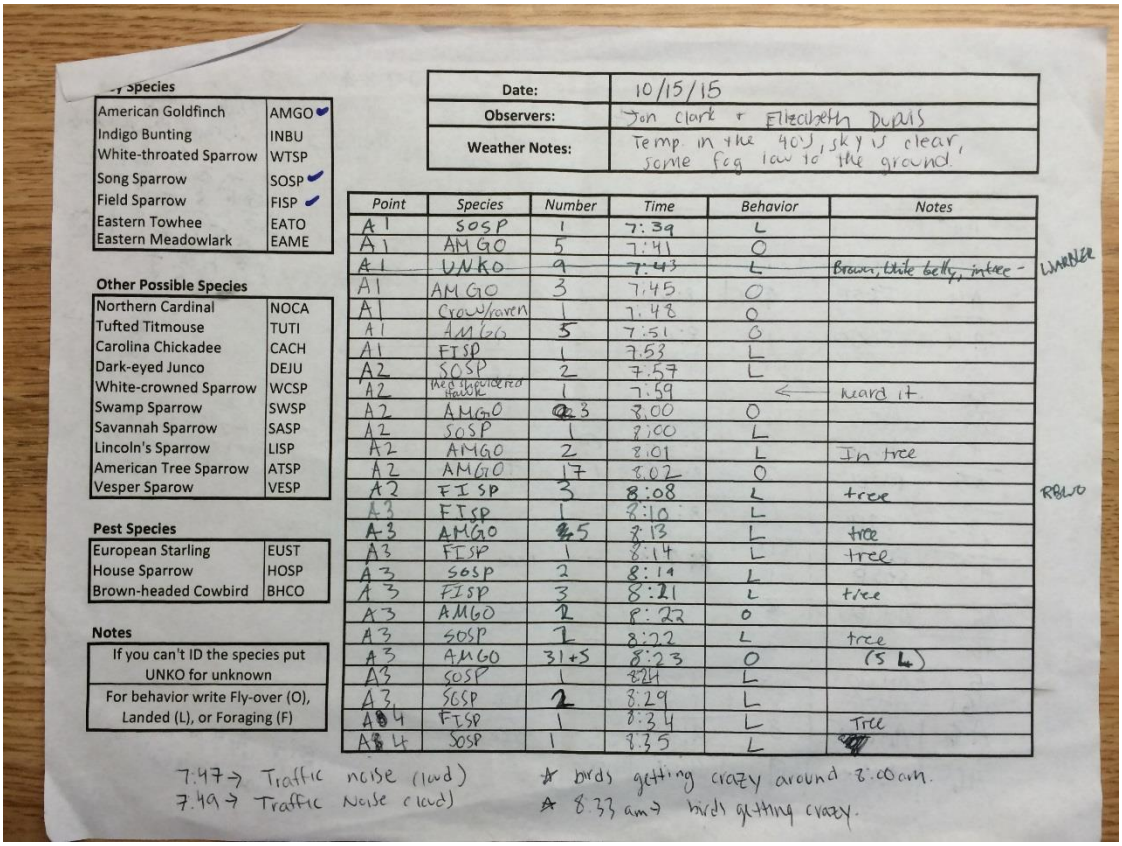
European Starling	EUST
House Sparrow	HOSP
Brown-headed Cowbird	BHCO

Notes

If you can't ID the species put UNKO for unknown
For behavior write Fly-over (O), Landed (L), or Foraging (F)

Date:	10/15
Observers:	Maggie + Haley
Weather Notes:	temp 46°, everything is damp, clear skies

Point	Species	Number	Time	Behavior	Notes
B1	FISP	2	7:45	Flyover	[illegible], blocky tail, paler belly
B1	"	1	7:46	Flyover	" " "
B1	A. Crow	1	7:48	Flyover	dark, larger than ↑, blocky tail
B2	FISP (nondescript sparrow)	2	8:00	Flyover	Belly [illegible]
B2	INBU	1	8:0[illegible]	Landed	little, brownish
B2	WTSP	1	8:09	Landed!	Yellow [illegible], white
B3	INBU	1	8:16	Landed	Blueish, brown/grayish
B3	EATO?	2	8:17	Landed	dark on top, whitish belly
B3	?	1	8:19	Flyover	grayish on top, white tail [illegible]
B3	FISP	2	8:23	Flyover	
B3	FISP?	5	8:24	Flyover	
B3	GBH!	1	8:24	Flyover	right behind FISP group!



Species

American Goldfinch	AMGO ✓
Indigo Bunting	INBU
White-throated Sparrow	WTSP
Song Sparrow	SOSP ✓
Field Sparrow	FISP ✓
Eastern Towhee	EATO
Eastern Meadowlark	EAME

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Lincoln's Sparrow	LISP
American Tree Sparrow	ATSP
Vesper Sparow	VESP

Pest Species

European Starling	EUST
House Sparrow	HOSP
Brown-headed Cowbird	BHCO

Notes

If you can't ID the species put UNKO for unknown
For behavior write Fly-over (O), Landed (L), or Foraging (F)

Date:	10/15/15
Observers:	Jon Clark + Elizabeth Dubois
Weather Notes:	Temp. in the 40's, sky is clear, some fog low to the ground.

Point	Species	Number	Time	Behavior	Notes
A1	SOSP	1	7:39	L	
A1	AMGO	5	7:41	O	
A1	UNKO	9	7:43	L	Brown, white belly, in tree - LWARBLER
A1	AMGO	3	7:45	O	
A1	Crow/raven	1	7:48	O	
A1	AMGO	5	7:51	O	
A1	FISP	1	7:53	L	
A2	SOSP	2	7:57	L	
A2	red shouldered hawk	1	7:59		← heard it
A2	AMGO	3	8:00	O	
A2	SOSP	1	8:00	L	
A2	AMGO	2	8:01	L	In tree
A2	AMGO	17	8:02	O	
A2	FISP	3	8:08	L	tree RBWO
A3	FISP	1	8:10	L	
A3	AMGO	5	8:13	L	tree
A3	FISP	1	8:14	L	tree
A3	SOSP	2	8:14	L	
A3	FISP	3	8:21	L	tree
A3	AMGO	2	8:22	O	
A3	SOSP	1	8:22	L	tree
A3	AMGO	31+5	8:23	O	(5 L)
A3	SOSP	1	8:24	L	
A3	SOSP	2	8:29	L	
A4	FISP	1	8:34	L	Tree
A4	SOSP	1	8:35	L	

7:47 → Traffic noise (loud)
7:49 → Traffic Noise (loud)

* birds getting crazy around 8:00 am.
* 8:33 am → birds getting crazy.

☆ Saw a lot of warblers ☆

- 9:02 – Traffic Noise
- 9:06 → snare drum in distance

Point	Species	Number	Time	Behavior	Notes
A4	SOSP	1	8:36	L	
A4	WCSP	1	8:37	L	
A4	FISP	4	8:42	L	tree
A4	SOSP	1	8:43	L	tree
A4	SOSP	1	8:47	L	
A5	FISP	1	8:49	L	
A5	AMGO	1	8:52	L	Tree
A5	AMGO	3	8:57	O	
A5	RWBL	2	8:38	L	Tree
A5	FISP	1	8:38	L	
A3	FISP SOSP	1 1	9:02	L	tree
A5	AMGO	8	9.03	L	Tree
A5	SOSP	2	9.03	L	
A6	AMGO	27	9.05	O	
A6	AMGO	5	9.05	L	Tree
A6	AMGO	8	9:14	L	tree
A6	AMGO	[illegible]	9:18	O	

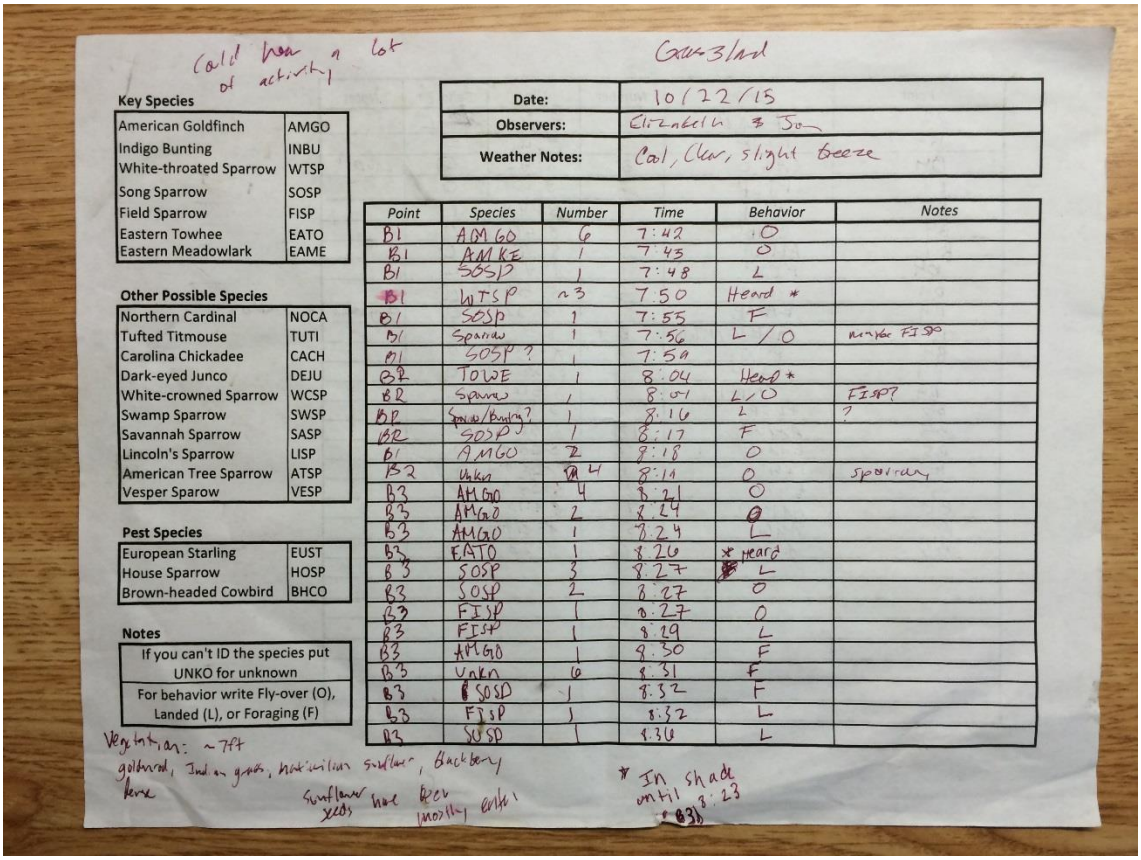
(oak saplings
Autumn olive, Cardinals)
Golden Rod
Q. A. Lace
Grasses
Scattered trees/shrubs
Honey suckle
Fleabane
Blackberry
Thistle

1m

(A6)
- Hawk → 9.07 → flew over + dove → white butt, red stomach.

Bird Activity slowed about 9

Appendix II: Raw Data Collected on 10/22/15 from Both Plots (WSG and then CREP)



Cold! Bear a lot of activity!

Grass/land

Key Species

American Goldfinch	AMGO
Indigo Bunting	INBU
White-throated Sparrow	WTSP
Song Sparrow	SOSP
Field Sparrow	FISP
Eastern Towhee	EATO
Eastern Meadowlark	EAME

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Northern Cardinal	NOCA
Tufted Titmouse	TUTI
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American Tree Sparrow	ATSP
Vesper Sparow	VESP

Pest Species

European Starling	EUST
House Sparrow	HOSP
Brown-headed Cowbird	BHCO

Notes

If you can't ID the species put UNKO for unknown
For behavior write Fly-over (O), Landed (L), or Foraging (F)

Date:	10/22/15
Observers:	Elizabeth & Jon
Weather Notes:	Cool, Clear, slight breeze

Point	Species	Number	Time	Behavior	Notes
B1	AMGO	6	7:42	O	
B1	AMKE	1	7:43	O	
B1	SOSP	1	7:48	L	
B1	WTSP	~3	7:50	Heard *	
B1	SOSP	1	7:55	F	
B1	Sparrow	1	7:56	L / O	maybe FISP
B1	SOSP ?	1	7:59		
B2	TOWE	1	8:04	Heard *	
B2	sparrow	1	8:01	L / O	FISP?
B2	Sparrow/Bunting?	1	8:16	L	?
B2	SOSP	1	8:17	F	
B1	AMGO	2	8:18	O	
B2	Unkn	~~2~~ 4	8:11	O	sparrow
B3	AMGO	4	8:21	O	
B3	AMGO	2	8:24	O	
B3	AMGO	1	8:24	L	
B3	EATO	1	8:26	* Heard	
B3	SOSP	3	8:27	L	
B3	SOSP	2	8:27	O	
B3	FISP	1	8:27	O	
B3	FISP	1	8:29	L	
B3	AMGO	1	8:30	F	
B3	Unkn	6	8:31	F	
B3	SOSP	1	8:32	F	
B3	FISP	1	8:32	L	
B3	SOSP	1	8:36	L	

Vegetation: ~7ft goldenrod, Indian grass, horseweed sunflower, blackberry

Sunflower seeds have been mostly eaten!

* In shade until 8:23 B3b

Point	Species	Number	Time	Behavior	Notes
B3	FISP	1	8:36	L	
B4	FISP	1	8:41	L	
B4	CAGO	36	8:42	O	LOUD
B4	FISP	3	8:44	O	
B4	FISP	1	8:44	L	
B4	INBU	1	8:46	O	
B4	AMGO	1	8:47	O	
B4	FISP	1	8:48	L	
B4	SOSP	2	8:50	L	
B4	EAME	1	8:52	O	Being Chased by smaller b. d
B4	AMGO	4	8:53	O	
B4	FUSP	5	8:53	O	
B4	FISP	2	8:55	O	
B4	INBU	1	8:56	L	
B5	FISP	1	8:58	L	
B5	AMGO	10	9:38	O	
B5	EAME	2	9:00	O	
B5	FISP	1	9:03	O	
B5	AMGO	12	9:10	O	
B6	AMGO	7	9:15	O	
B6	AMGO	5	9:45	O	
B6	AMGO	36	9:23	O	

Key Species

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White-throated Sparrow	WTSP
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Pest Species

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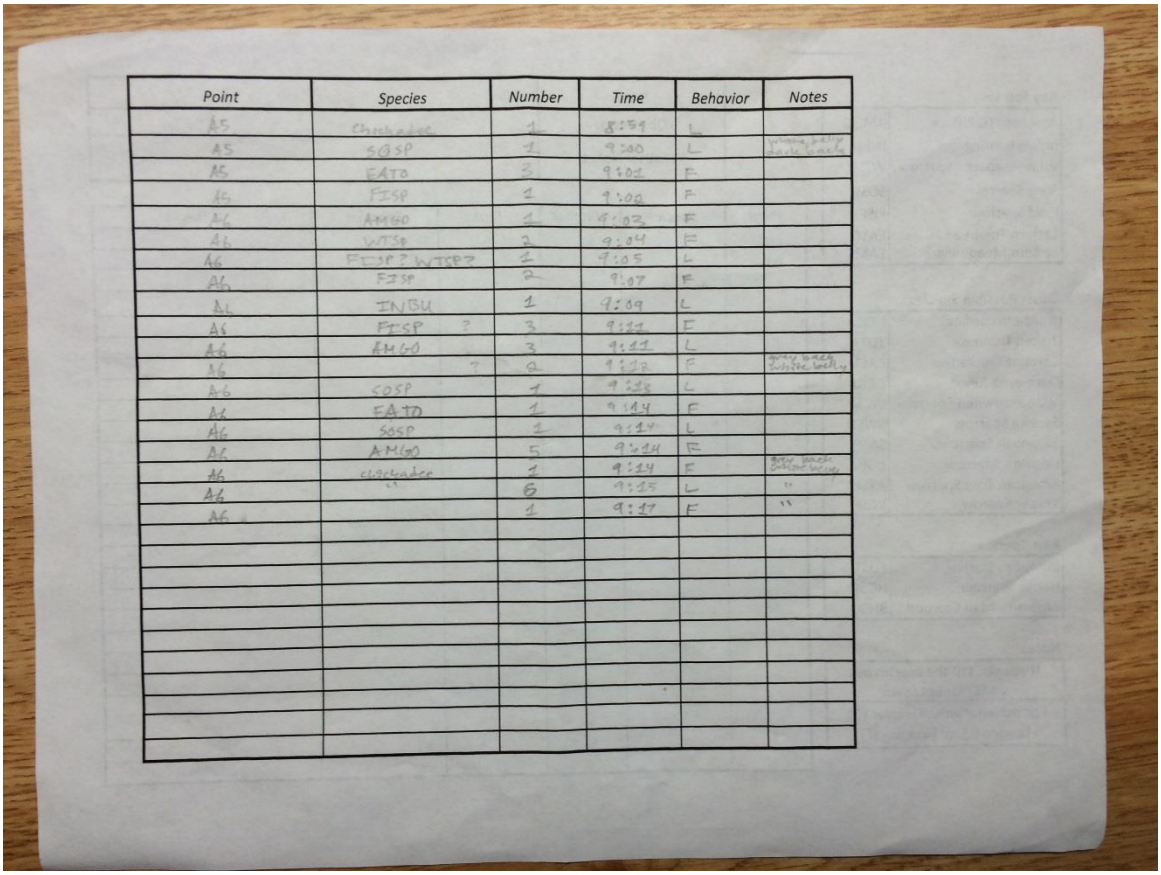
House Sparrow	HOSP
Brown-headed Cowbird	BHCO

Notes

If you can't ID the species put UNKO for unknown
For behavior write Fly-over (O), Landed (L), or Foraging (F)

Date:	10/22/2013
Observers:	Maggie + Haley
Weather Notes:	sunny/clear

Point	Species	Number	Time	Behavior	Notes
A1	CACH	1	7:56	L	in small tree
A1	FISP	1	7:57	F	but flew from in plot
A2	FISP ?	6	8:02	F	landed in trees (big)
A2	"	11	8:04	F	kept on going
A2	SOSP	1	8:04	L	was in blackberries
A3	crow	1	8:22	F	only 1 of a group flew over plot
A4	FISP	3	8:36	F	landed in tree (big)
A4	Mockingbird	1	8:36	L	landed twice in trees
A4	FISP	1	8:37		
A4	"	1	8:37	L	yellow belly, darker head
A4	sparrow	4	8:37	F	
A4	AMGO	1	8:41	F	tree
A4	Flicker	1	8:41	F	
A4	WTSP	1	8:41	F	
A4	crow	1	8:42	F	
A4	WTSP	1	8:42	L	
A4	WTSP	1	8:46	F	
A4	FISP	1	8:46	F	
A5	Mockingbird	1	8:50	L	maybe same as before?
A5	WTSP	1	8:51	L	
A5	FISP	1	8:52	F	
A5	EATO	2	8:53	L	they are shrub friends.
A5	AMGO	3	8:54	F	
A5	FISP ?	1	8:55	F	
A5	mockingbird	5	8:56	F	some repeated
A5	AMGO	1	8:57	F	



Point	Species	Number	Time	Behavior	Notes
A5	chickadee	1	8:59	L	
A5	SOSP	1	9:00	L	
A5	EATO	3	9:01	F	
A5	FISP	1	9:02	F	
A6	AMGO	1	9:03	F	
A6	WTSP	2	9:04	F	
A6	FISP? WTSP?	2	9:05	L	
A6	FISP	2	9:07	F	
A6	JUNCO	1	9:09	L	
A6	FISP ?	3	9:11	F	
A6	AMGO	3	9:11	L	
A6	?	2	9:12	F	
A6	SOSP	1	9:13	L	
A6	EATO	1	9:14	F	
A6	SOSP	1	9:14	L	
A6	AMGO	5	9:14	F	
A6	chickadee	1	9:14	F	
A6	"	6	9:15	L	"
A6		1	9:17	F	"