



# Winter weight gain or breeding activity weight loss: How does Dark-eyed Junco weight seasonally differ?

The Power of **AND**

University of Wisconsin  
**Eau Claire**

AN ANALYSIS OF BEAVER CREEK RESERVE BANDING DATA ON THE DARK-EYED JUNCO

Thomas Gustafson, Morgan Wilde, and Hannah Wirth | Faculty Mentor: Paula Kleintjes-Neff | University of Wisconsin-Eau Claire Biology Department

## INTRODUCTION

- Dark-eyed Juncos of the Slate-colored subspecies (SCJU) are boreal migrants that over winter in lower latitudes, such as Wisconsin. In the spring, Juncos migrate to northern breeding grounds.
- The purpose of this research is to determine whether there is a weight difference between pre-breeding (March- May) and post-breeding (September- November) Juncos banded at Beaver Creek Reserve (BCR), Fall Creek, WI.
- Fat accumulates in the furculum on the birds and is visible to the naked eye.
- We used data collected from the Bird Banding Program (2007-2016).



Figure 1a. Dark-eyed Junco of unknown sex.



Figure 1b. Dark-eyed Junco of unknown sex banded at BCR.

Figure 1c. Data records of captured birds at BCR.

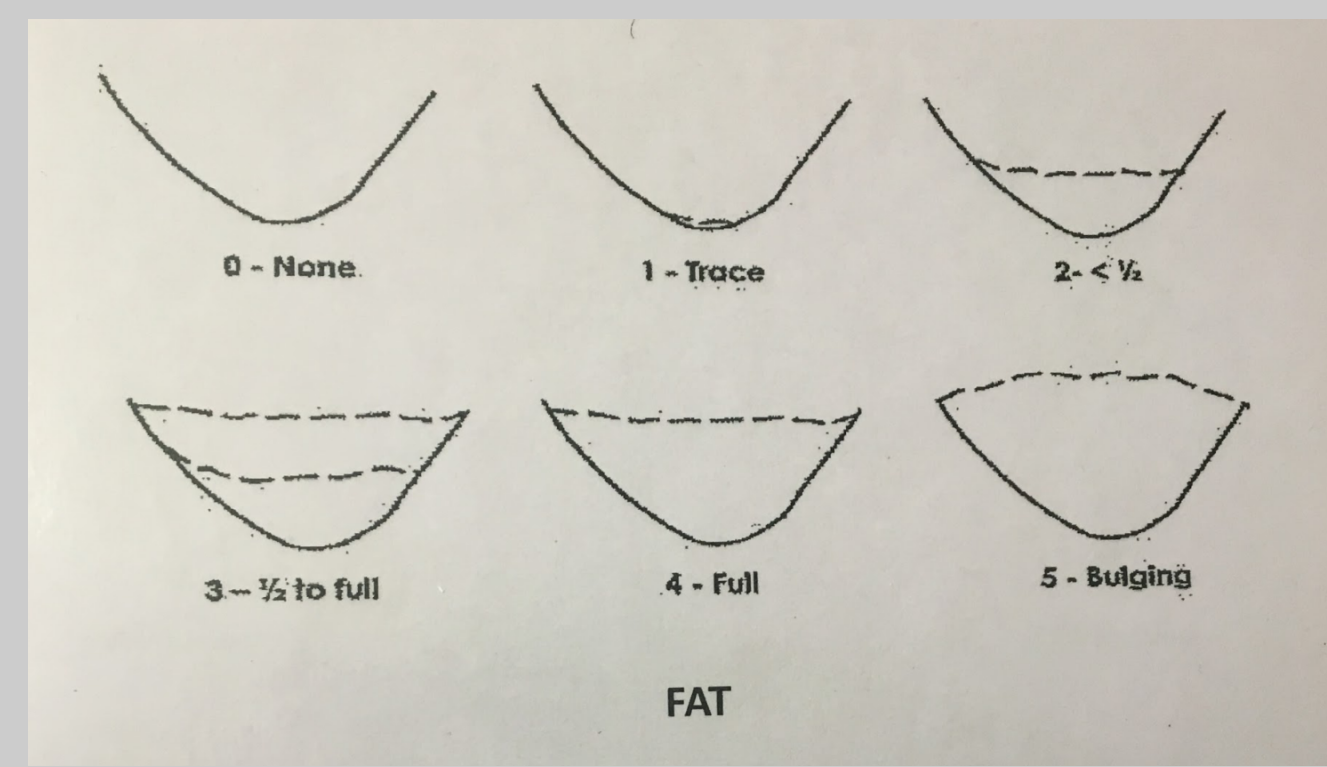


Figure 1d. Fat deposit code chart used in BCR's data records.

## Dark-eyed Junco Biology

The Dark-eyed Junco (*Junco hyemalis*) is in the sparrow family and has a dark gray head/mantle, a white belly/outer tail feathers. They have a distinctive pink beak, and sexes look similar (Figure 1a). Juncos primarily nest and forage on the ground and in the underbrush. In the winter their diet is mainly seeds, but during the breeding season where more energy is required they eat insects and spiders. Juncos are boreal migrants that breed in Canada in the spring, and over-winter in the lower 48 and southern Canada (Figures 2a and 2b). Traveling at night in groups, the peaks of their migrations occur in March/April and October.

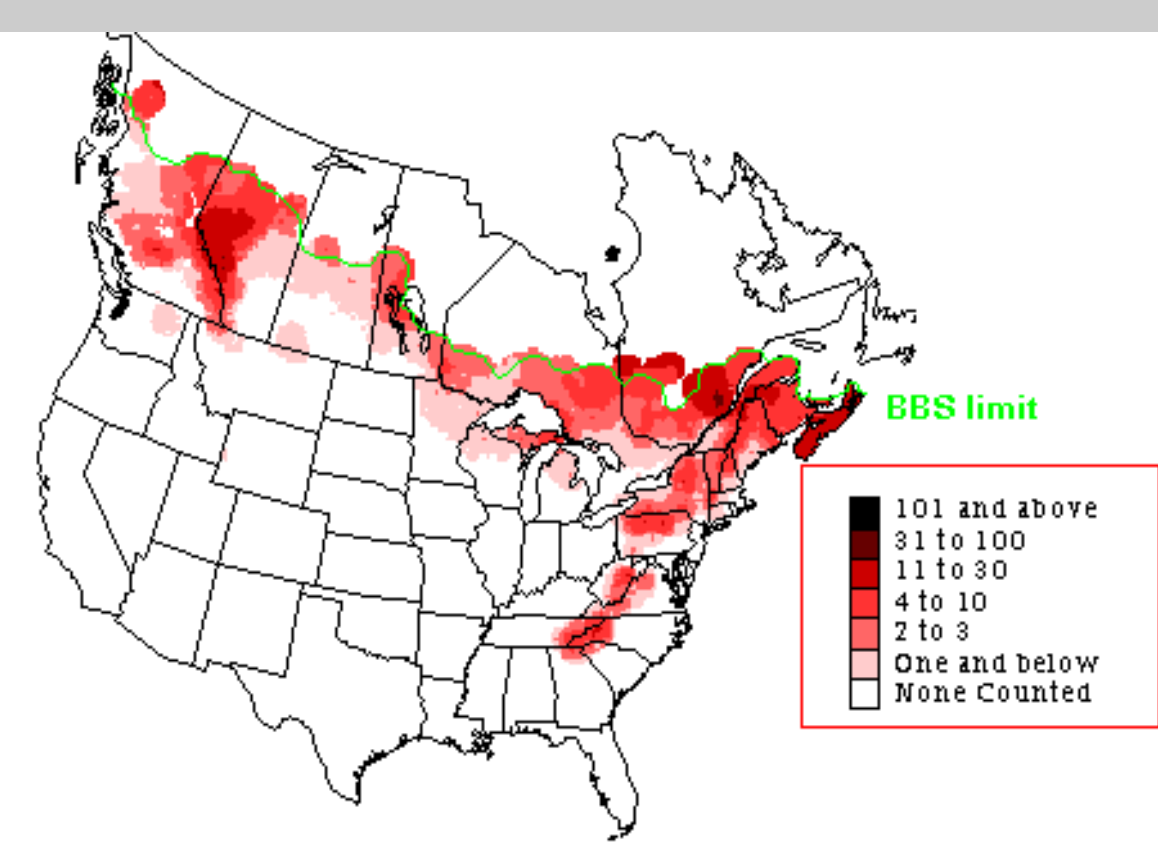


Figure 2a. The summer distribution map of the Dark-eyed Junco.

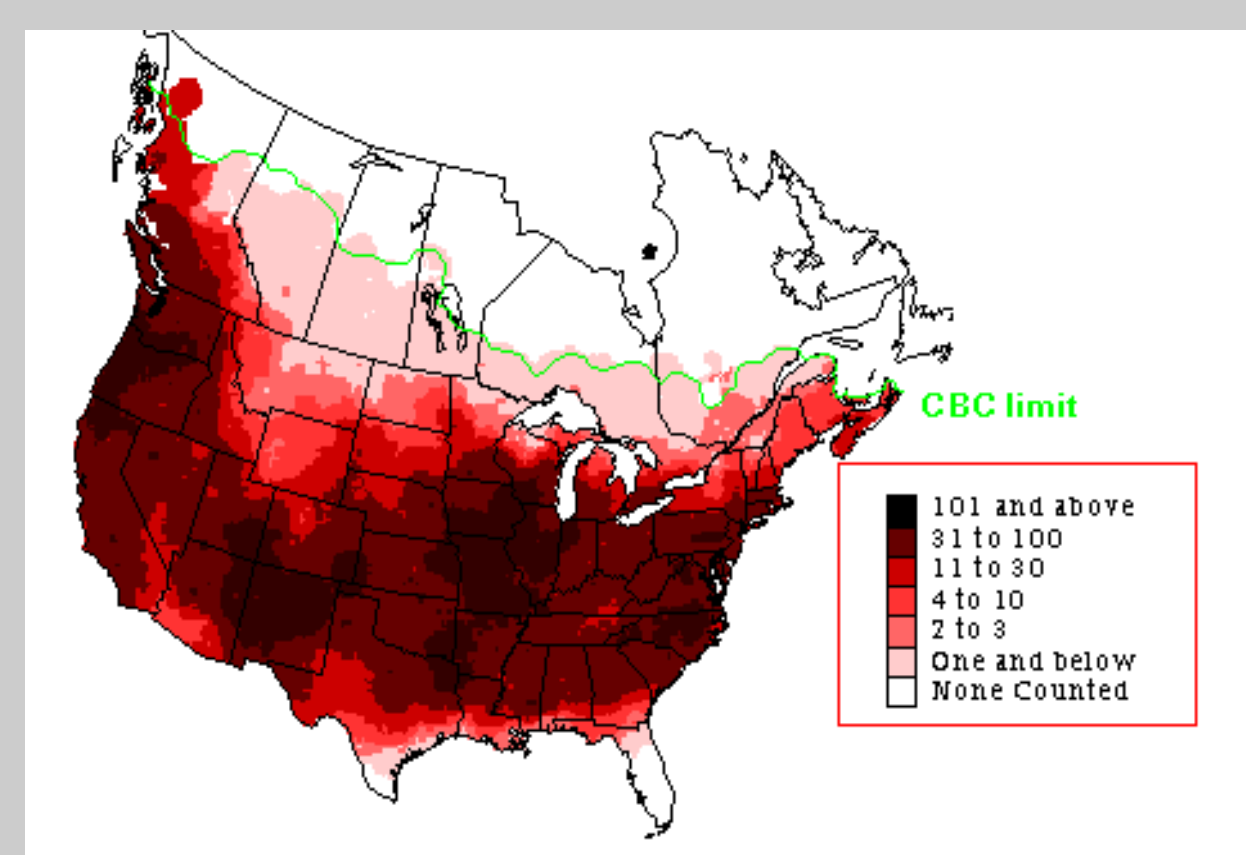


Figure 2b. The winter distribution map of the Dark-eyed Junco.

## METHODS

- We obtained all records of banded SCJU data from BCR from 2007-2016.
- Recaptures in the bird data were removed as well as any other errors before analysis.
- Data were sorted by year and season as well as by band number, which included a minimum sample size (n=15) of captured, banded, and weighed birds.
- We obtained enough data for 6 seasons each consisting of pre (FALL: September- November) and post-winter (SPRING: March- May).
- One-way ANOVA was used to compare means among years for each season (fall or spring), and unpaired t-tests to compare means between seasons pooled across all years.
- T-tests were also used to compare mean weight for each season (fall vs. spring), and Mann-Whitney U test used for 2007-2008 season.
- Data met the assumptions for ANOVA and were analyzed with GraphPad Prism.

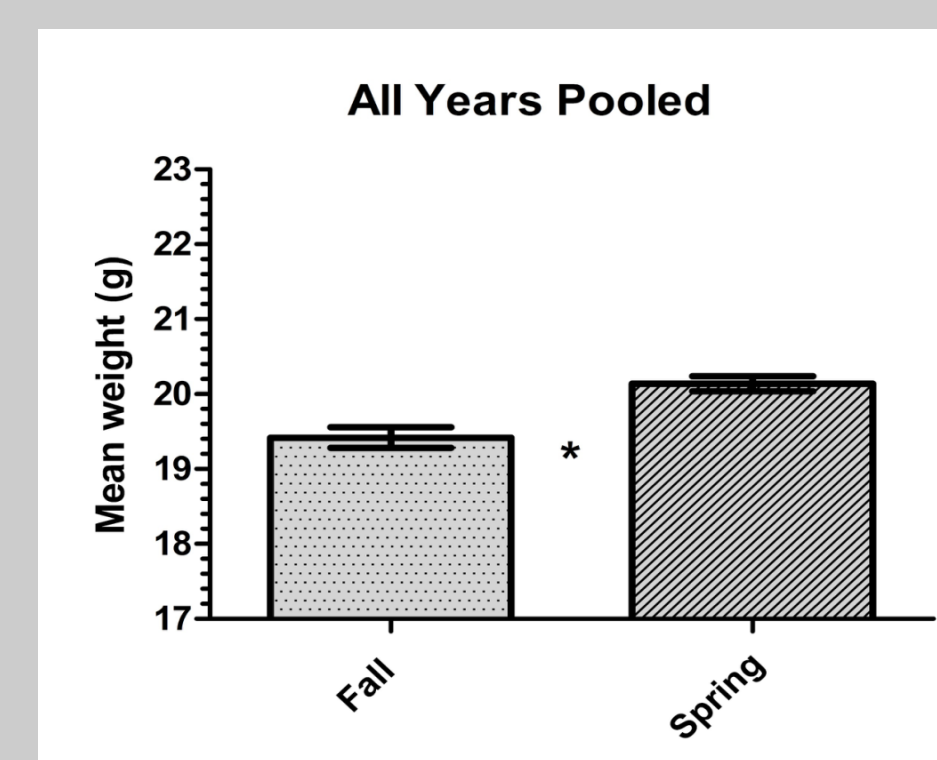


Figure 3a. All years pooled by season.

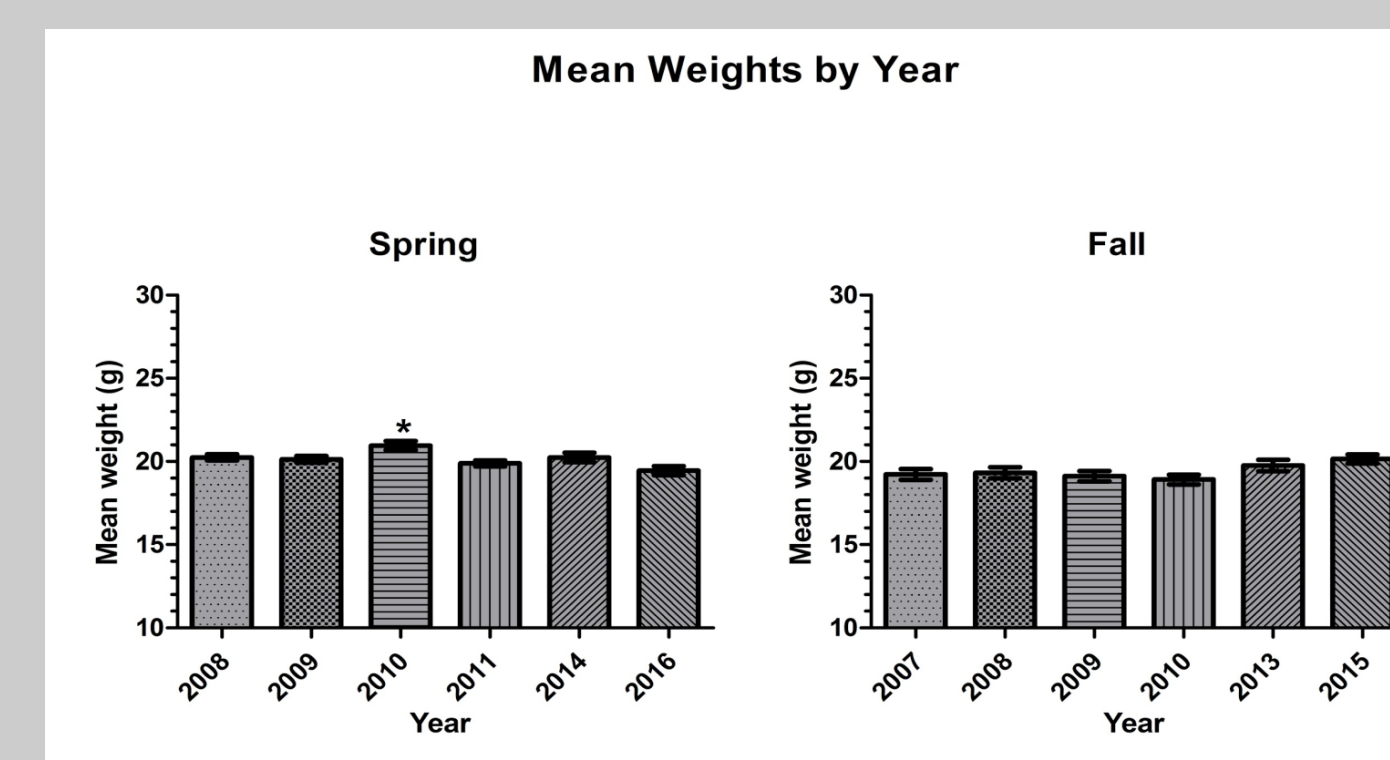


Figure 3b. Mean weights of SCJU by year.

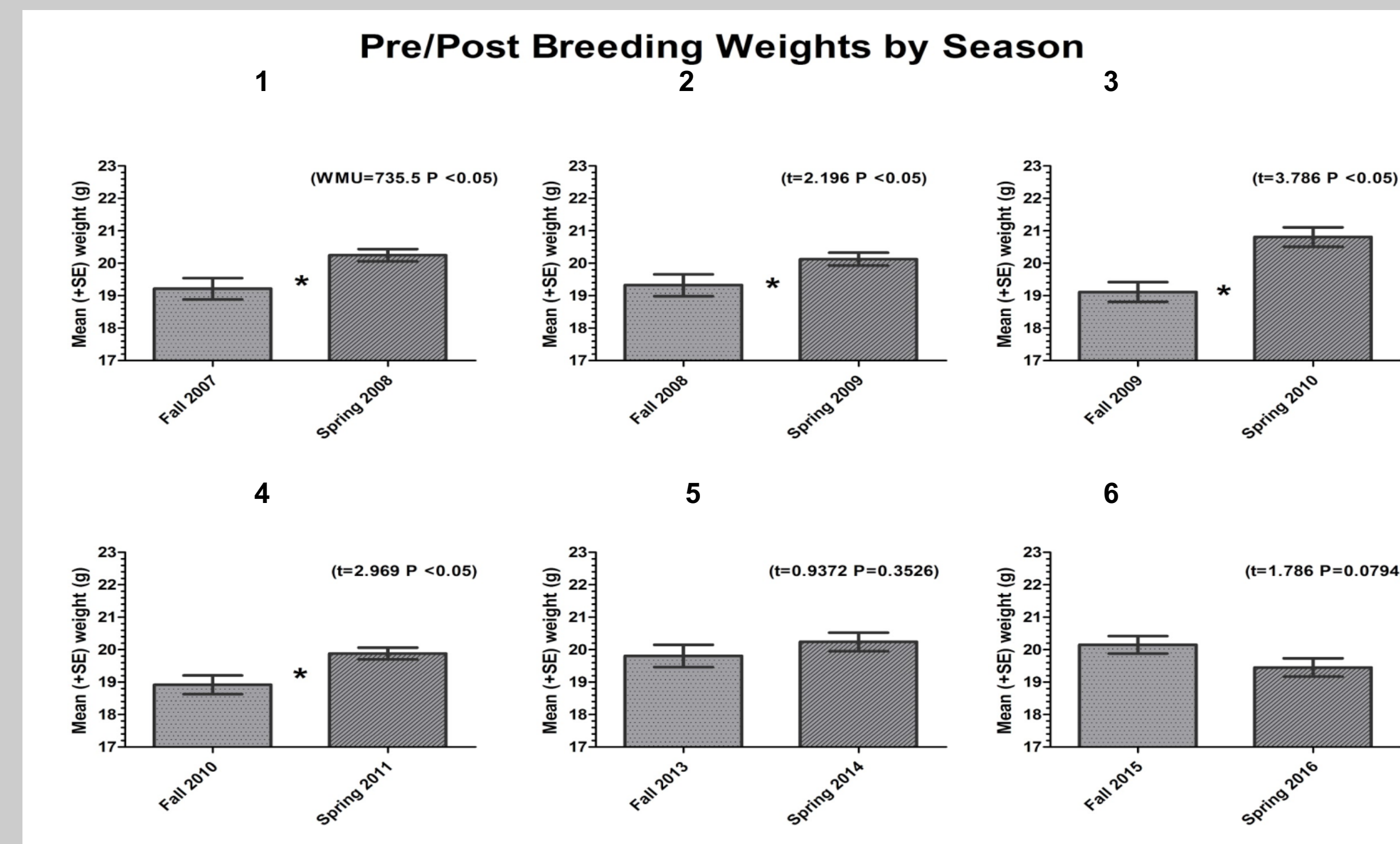


Figure 3c. Sexes pooled within each season.

## RESULTS

- N=166 total birds for 6 fall seasons pooled.
- N=238 birds for 6 springs pooled.
- A minimum of 15 birds in fall 2008, to a maximum of 63 birds in spring 2007 were used in the data analysis.
- An average of 34 (± 12.1 SD) birds banded one time per season.
- Average fall weights of juncos are 0.72 grams less than average spring weights. T-test (p<0.05) showed this difference is significant (Figure 3a.).
- The overall average weights across years did not significantly differ (p<0.05). Exception in spring of 2010 to spring 2011, and spring 2010 to spring 2016 (Figure 3b).
- Seasons 1, 2, 3, and 4 showed significant difference between fall and spring weights (Figure 3c).

## DISCUSSION

- Our hypothesis, weight of captured SCJU would significantly differ between fall and spring is supported. SCJU weigh significantly more in the spring. In both our individual year analyses (Figure 3c) and our analysis of the years pooled (Figure 3a), birds weighed more in the spring than in the fall. Our assumption that spring birds would have increased fat in preparation for migration was supported.
- Our results support C.M. Rogers et al., (1997). They found greater winter fat reserves are vital to Junco survival and subsequent migration.
- Possible sources of error in our analysis could be due to several factors including: inconsistent banding hours, variation in sample sizes, and recording errors. Therefore, seasons and years with too few birds banded were not used, and the remaining years were tested against each other for consistency (Figure 3b).



Figure 4a. Tom releasing a Dark-eyed Junco.

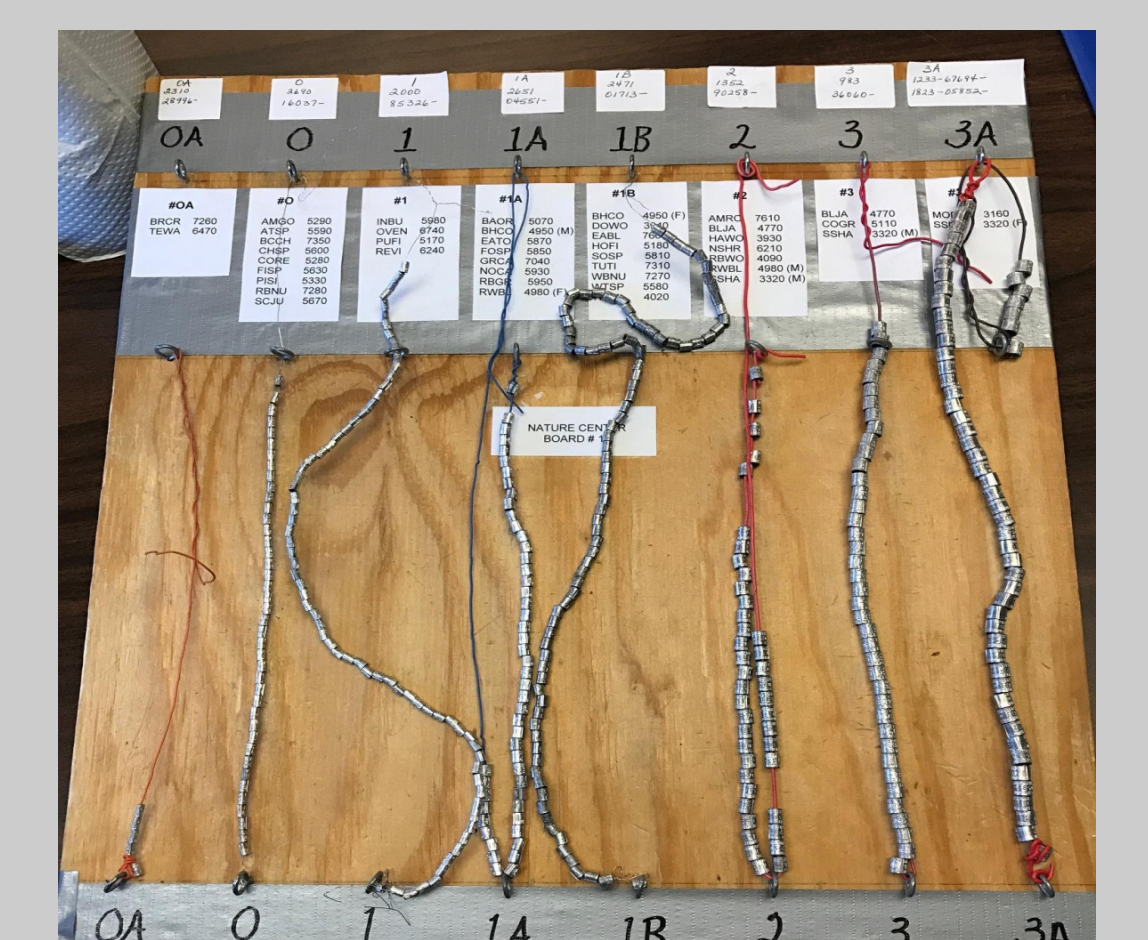


Figure 4b. Bands of different sizes used for bird banding at BCR.



Figure 4c. Morgan releasing Dark-eyed Junco.



Figure 4d. Hannah checking for a bird band on a Dark-eyed Junco.

## REFERENCES

- ALDERFER, J. [online]. 2006. National Geographic Complete Birds of North America, 2nd Edition: American Goldfinch. <<http://animals.nationalgeographic.com/animals/birding/american-goldfinch/>> (6 February 2017).
- CORNELL UNIVERSITY. [online]. 2015. The Cornell Lab of Ornithology: All About Birds. <[https://www.allaboutbirds.org/guide/American\\_Goldfinch/id](https://www.allaboutbirds.org/guide/American_Goldfinch/id)> (6 February 2017).
- DROEGE, S. [online]. 2000. Birds and Landscape Changes in Northeastern Forests. <<http://biology.usgs.gov/s+t/SNT/noframe/ne120.htm>> (7 February 2017).
- KAUFMAN, K. [online]. 2016. Audubon: Guide to North American Birds. <<http://www.audubon.org/field-guide/bird/american-goldfinch>> (6 February 2017).
- PYLE, P. 1997. Identification Guide to North American Birds: Columbidae to Ploceidae. pp. 686. Slate Creek Press
- ROGERS, C. 1997. Winter Fattening in the Dark-Eyed Junco: Plasticity and Possible Interaction with Migration Trade-Offs. *Oecologia*, Vol. 97, No. 4, pp. 526-532

## ACKNOWLEDGEMENTS

Thank you to Beaver Creek Reserve for the use of their 2007-2016 bird banding data. A special thanks to Dr. Paula Kleintjes-Neff, Bruce Steger, Jeanette Kelly, and bird banding staff for their collaboration and work on this project.