

# COYOTE CREEK FIELD STATION

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Data Knights

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# Agenda

- ▶ Introduction to the Data
- ▶ Meta Data
- ▶ Target Audience
- ▶ Research Questions
- ▶ Data Cleaning
- ▶ Data Analysis
- ▶ Data Visualizations
- ▶ Limitations
- ▶ Interpretations from Data

# Introduction to the Data

- ▶ The Dataset is 20 years of Bird Banding Data from Coyote Creek Field Station.
- ▶ It contains Data collected between the years 1996 – 2002.
- ▶ The dataset contains various details collected when a bird is trapped in one of the trap sites.

# Meta Data

- ▶ **Band Number** is the a unique number given to each bird when they are first captured. It helps to identify each bird uniquely.
- ▶ **Capture Date** is the date on which the bird was captured **First Captured Date** and **Last Captured Date** gives the first and last encounter date for the individual bird. **Capture Type** enables us to know if it is a newly captured bird or a returning bird.
- ▶ **Species Code** is a unique code given to each species. (We are planning to replace this field with species name to avoid any confusion)
- ▶ **Trap site** gives us the details about the site in which the bird was captured.
- ▶ **Age, Sex, Fat, Weight** gives us the details of age, sex, fat stored in the furcular hollow of the birds body and Mass of the bird in grams respectively.
- ▶ **BroodPatch** and **CloacalProtuberance** are the female and male breeding characteristics respectively.
- ▶ **WingMolt** identifies molting feathers in the wing and tail of the bird.
- ▶ **PrimaryWear** is the amount of wear in the wing feather tips.
- ▶ **WingLength** is the length of the wing of the bird when captured in millimeters.

# Target Audience

- ▶ Employees/ Staff of Coyote Creek Field Station.
- ▶ Researchers in Biology, Ecology and Environmental Studies.
- ▶ Conservationists to spread awareness and improve conservation.

# Research Questions

- ▶ How is bird banding data changing over time?
- ▶ Does habitat type affect the frequency and diversity of birds being captured?
- ▶ Has the sex ratios for birds changed significantly, and does it have a trend?
- ▶ Has the number of bird species seen each year been stable or trending in a certain direction?
- ▶ Has been any change in the wing to weight ratio of the birds over past 20 years?
- ▶ Finding the seasonal patterns in the weight changes in the birds.
- ▶ Finding the seasonal patterns in Wing to Weight Ratio changes in birds.

# Data Cleaning Process

- ▶ Many of the bird attributes have missing data in the earlier years.
- ▶ The Date Field was split into months, years during Data Cleaning for performing data analysis.
- ▶ The Data from years 1999 and 2002 was deleted due to incomplete data.
- ▶ Weight outliers have been set to N/A.
- ▶ Created a new column called "wingToWeightRatio" to perform some analyses.

# Data Analysis

- ▶ Count of each species of Bird sighted in different Habitats over the span of 20 years.

- ▶ Song Sparrow

	Habitat	freq
1	1987 Revegetation	1924
2	1993 Revegetation	2762
3	Mature Riparian	2126
4	Overflow Channel	4185

- ▶ Bewick's Wren

	Habitat	freq
1	1987 Revegetation	381
2	1993 Revegetation	717
3	Mature Riparian	380
4	Overflow Channel	325

- ▶ Chestnut-backed Chickadee

	Habitat	freq
1	1987 Revegetation	450
2	1993 Revegetation	226
3	Mature Riparian	592
4	Overflow Channel	238

- ▶ Common Yellowthroat

	Habitat	freq
1	1987 Revegetation	766
2	1993 Revegetation	998
3	Mature Riparian	327
4	Overflow Channel	3275

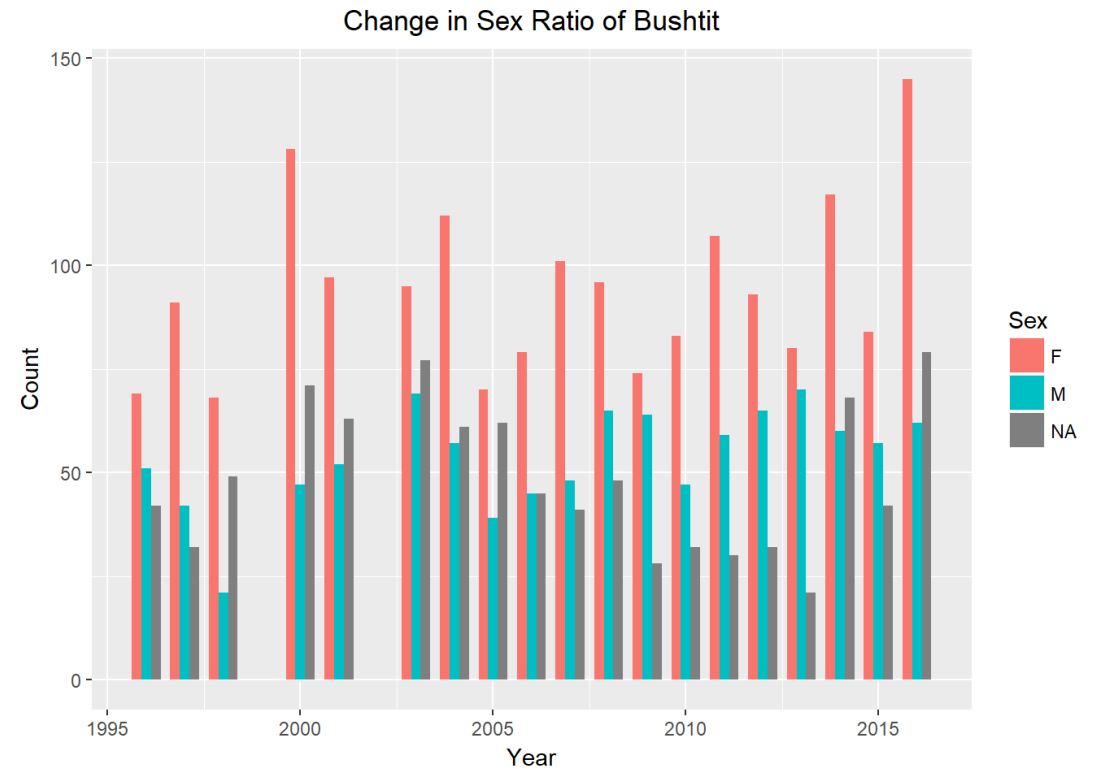
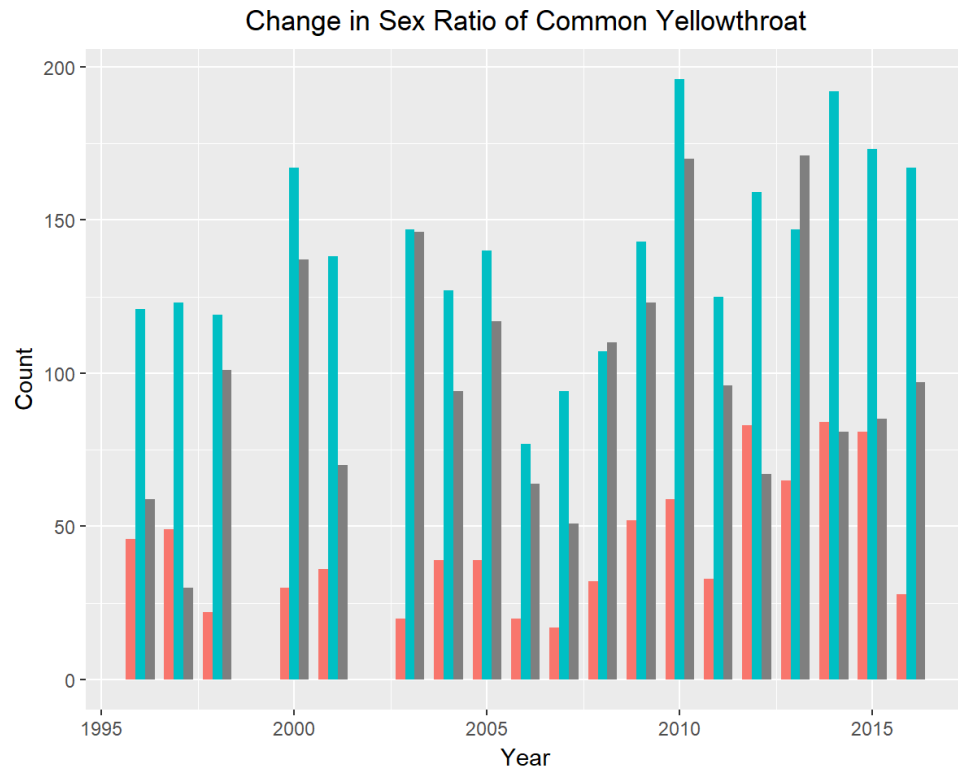
- ▶ Bushtit

	Habitat	freq
1	1987 Revegetation	604
2	1993 Revegetation	961
3	Mature Riparian	382
4	Overflow Channel	1785



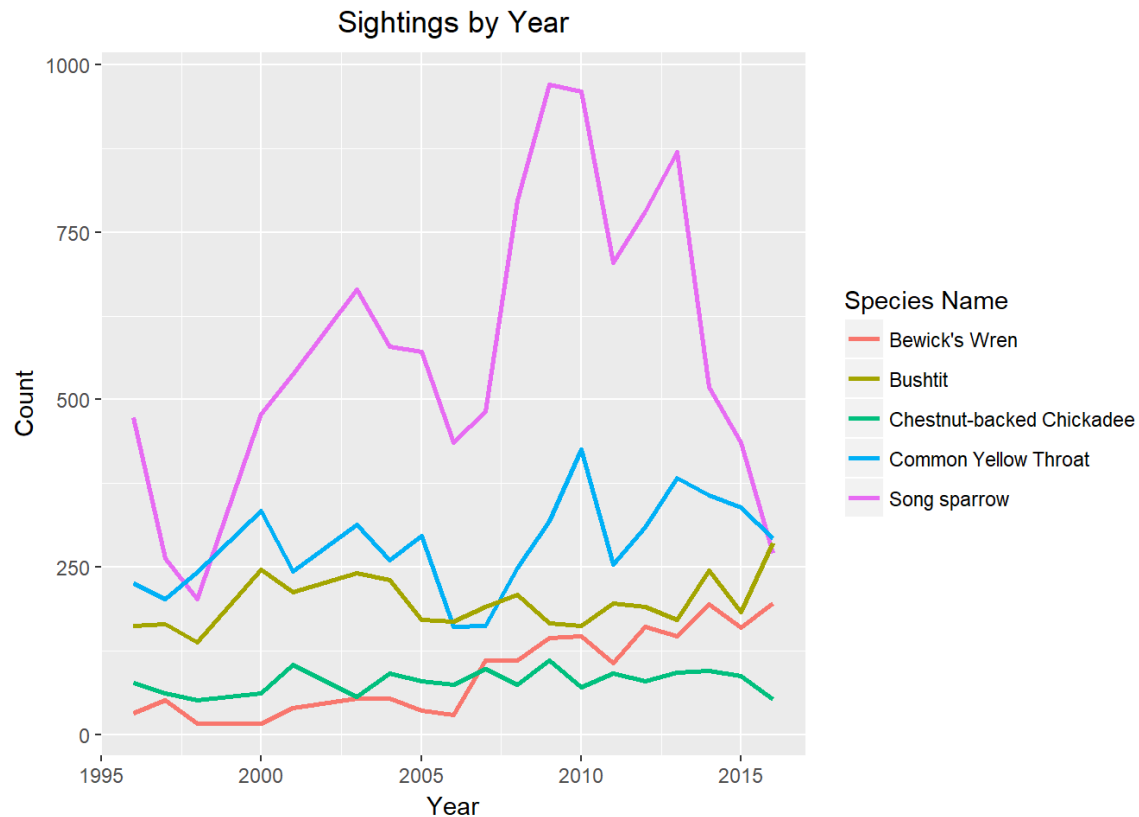
# Data Visualization

- Change in the Sex Ratio of Different species over the years



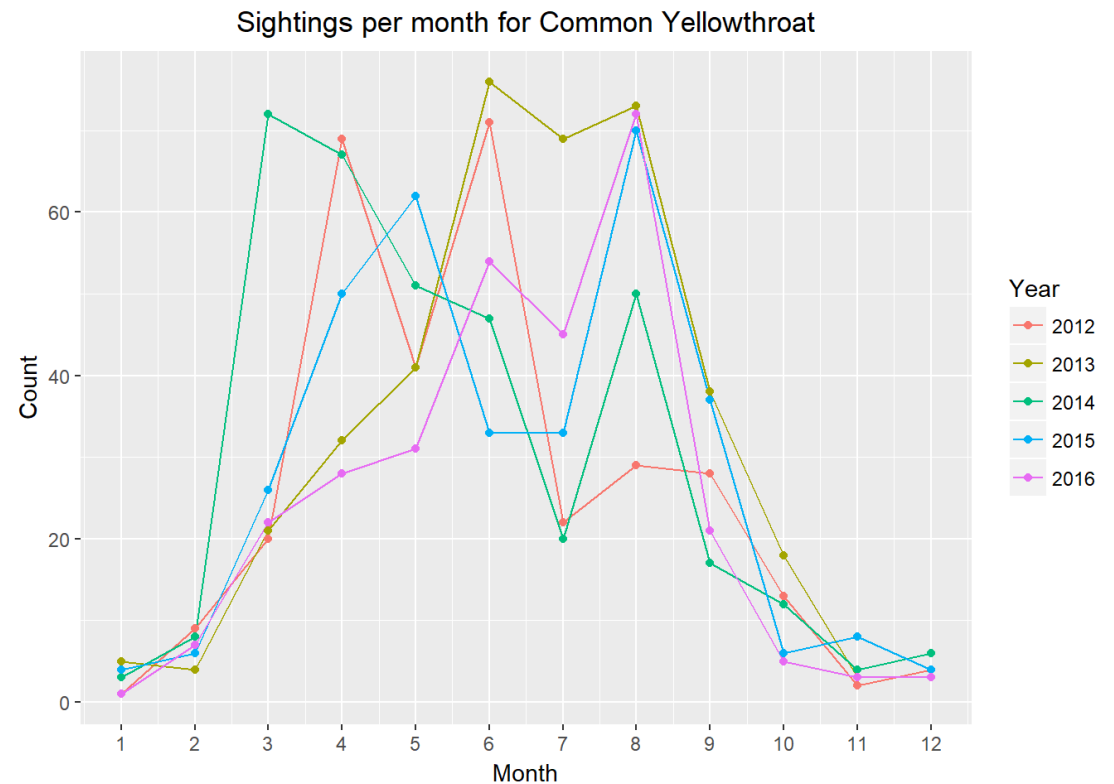
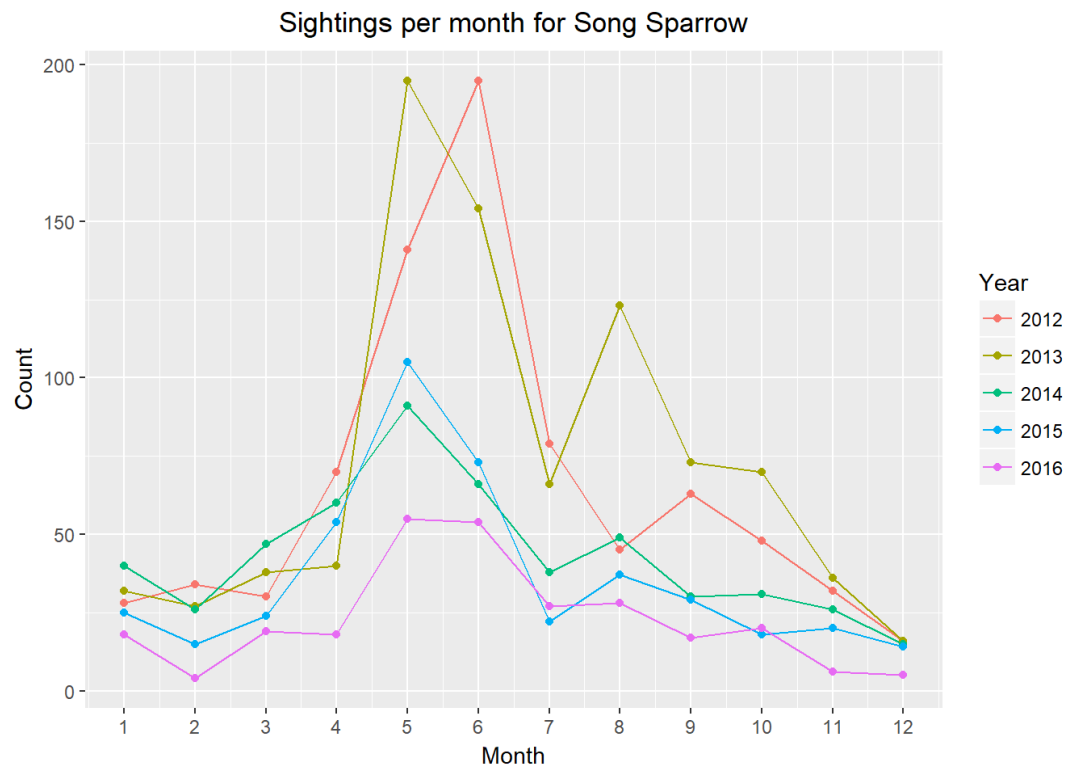
# Data Visualization

- Number of Sightings of different species over the years



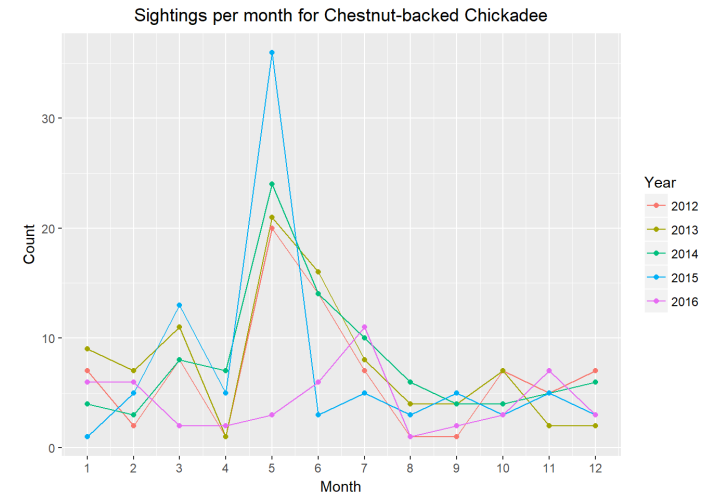
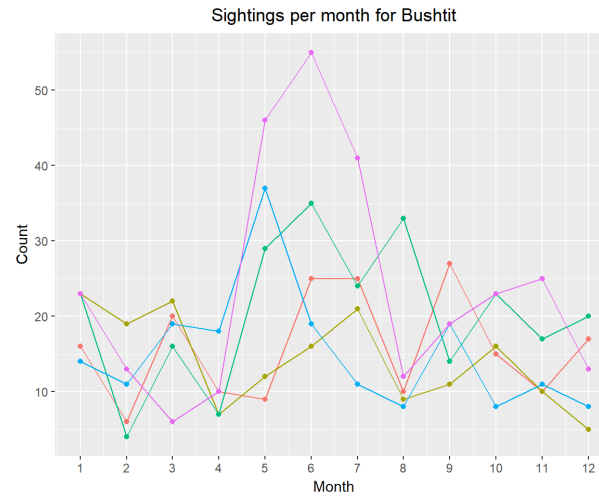
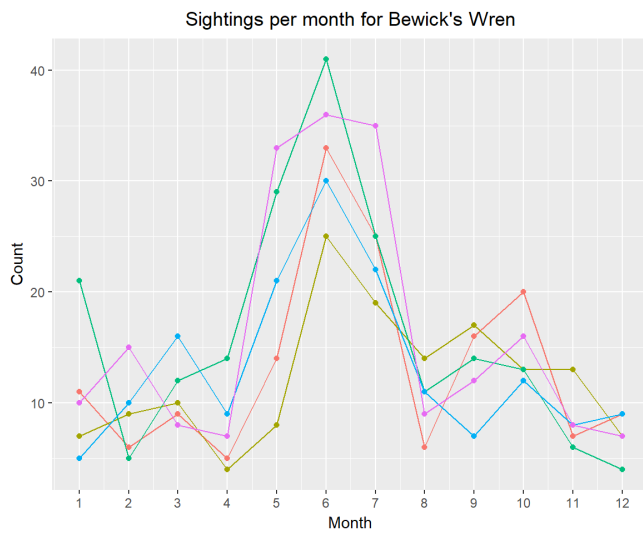
# Data Visualization

- Number of Sightings of different Species by month over the span of 5 years



# Data Visualization

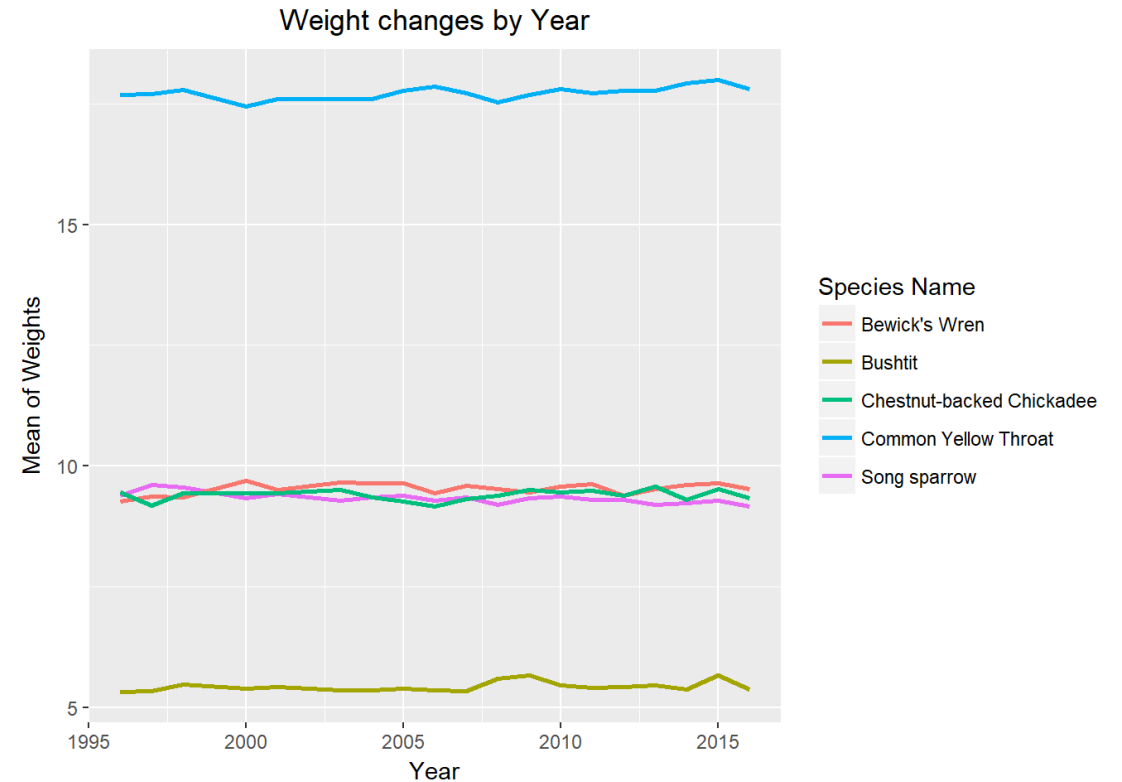
- ▶ Number of Sightings of different Species by month over the span of 5 years



# Data Visualization

- Change in the average weight of each species over the span of 20 years

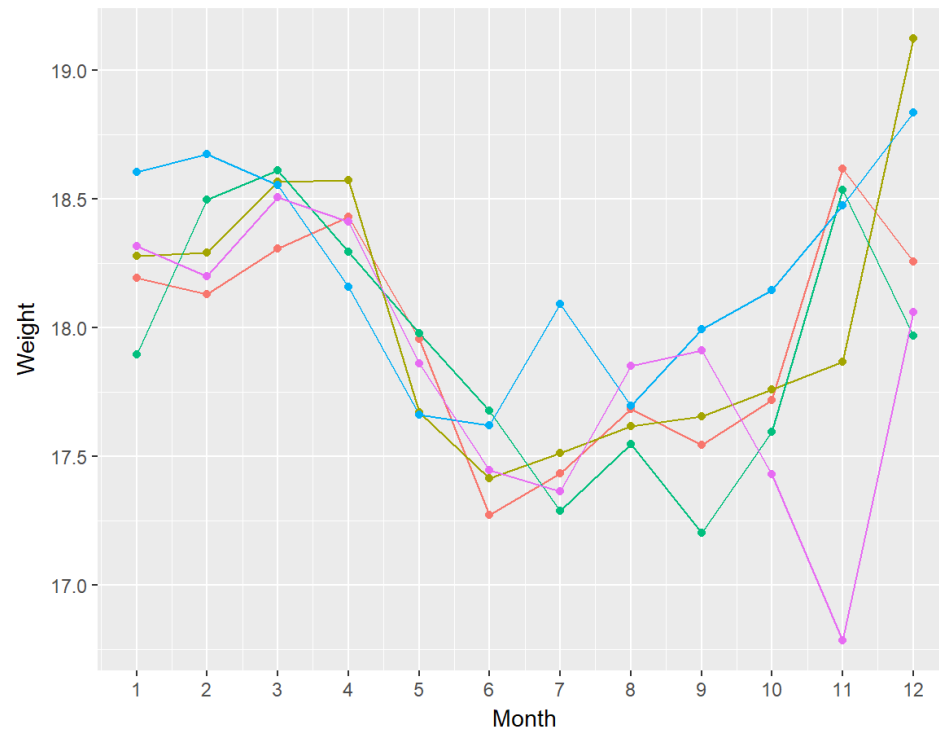
- The average weight of all the species is constant over the past 20 years.



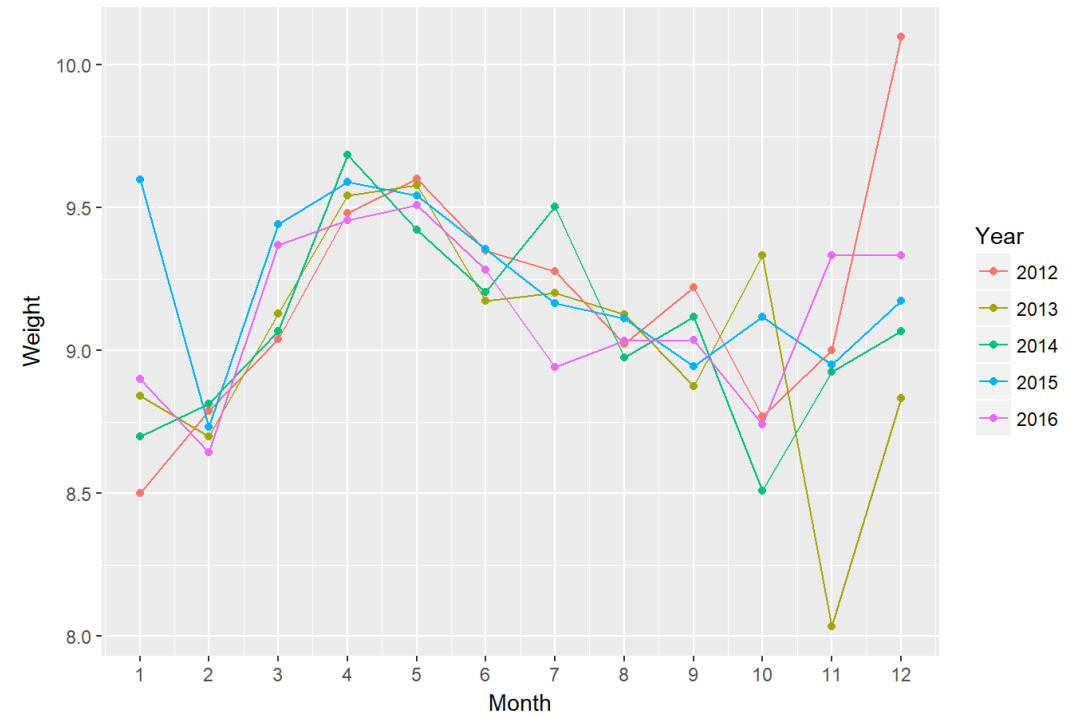
# Data Visualization

- Change in the average weight of each species by month over the span of 5 years

Weight changes per month for Song Sparrow



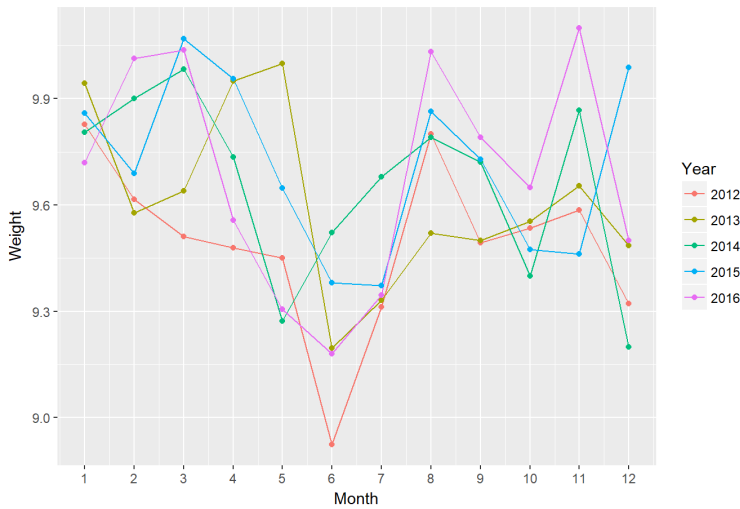
Weight changes per month for Common Yellowthroat



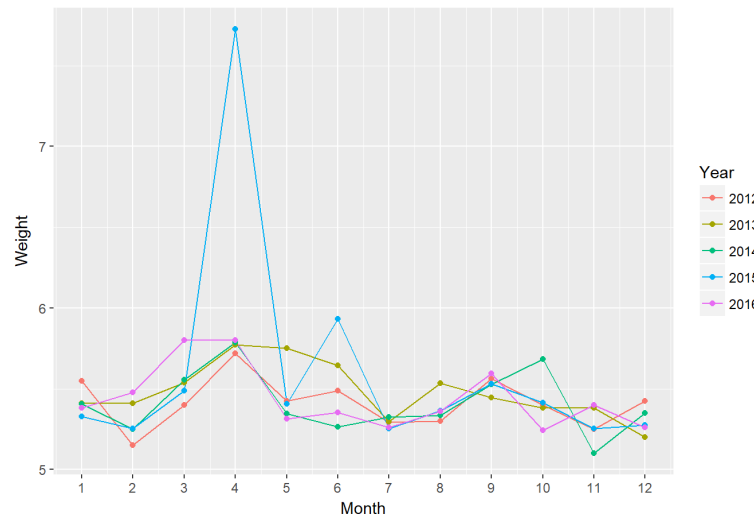
# Data Visualization

- Change in the average weight of each species by month over the span of 5 years

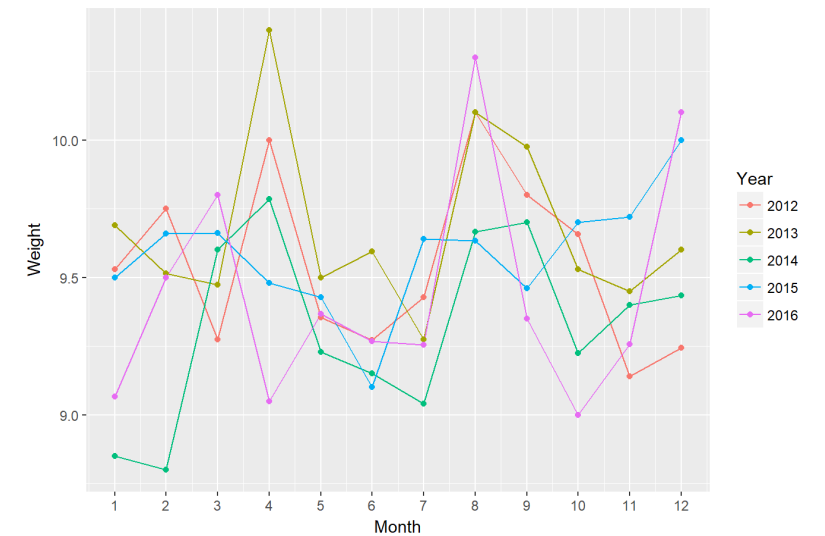
Weight changes per month for Bewick's Wren



Weight changes per month for Bushtit



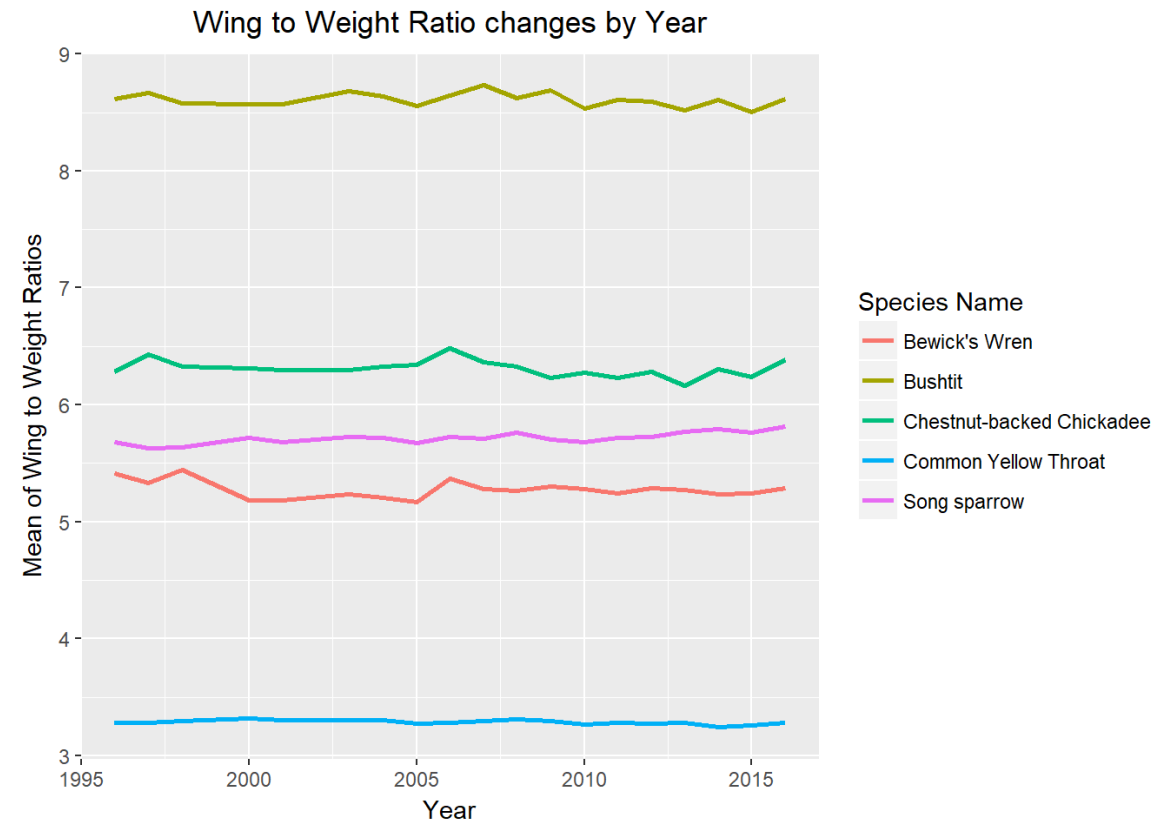
Weight changes per month for Chestnut-backed Chickadee



# Data Visualization

- Change in the average Wing to Weight Ratio of each species over the span of 20 years

- The average wing to weight ratio of all the species is constant over the past 20 years.

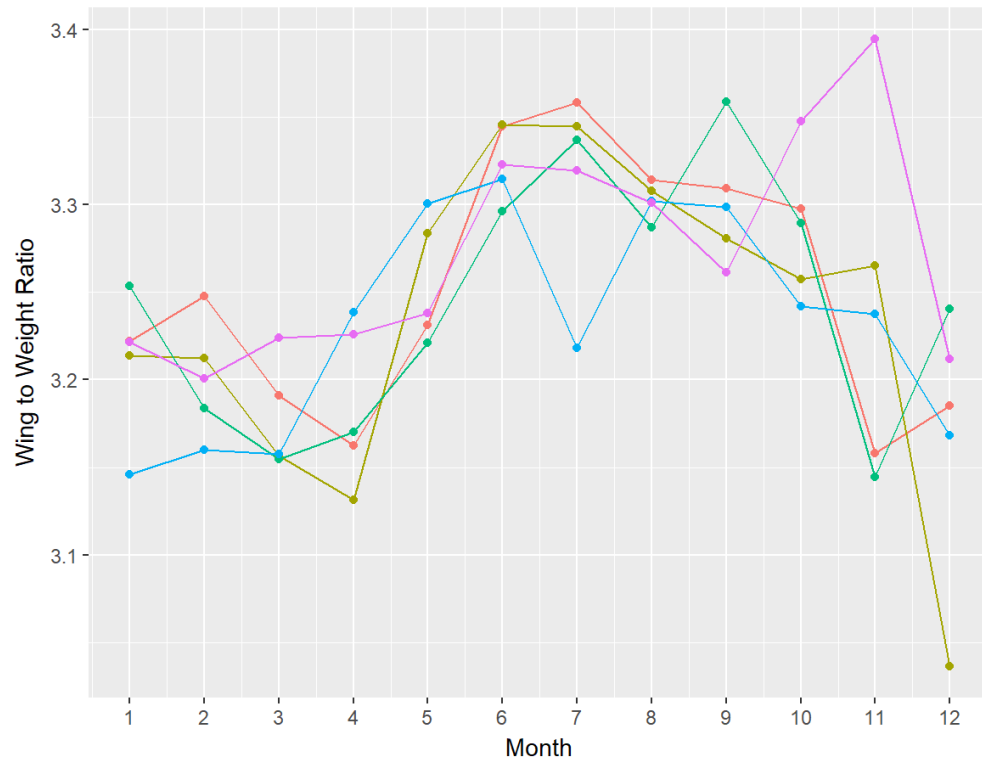




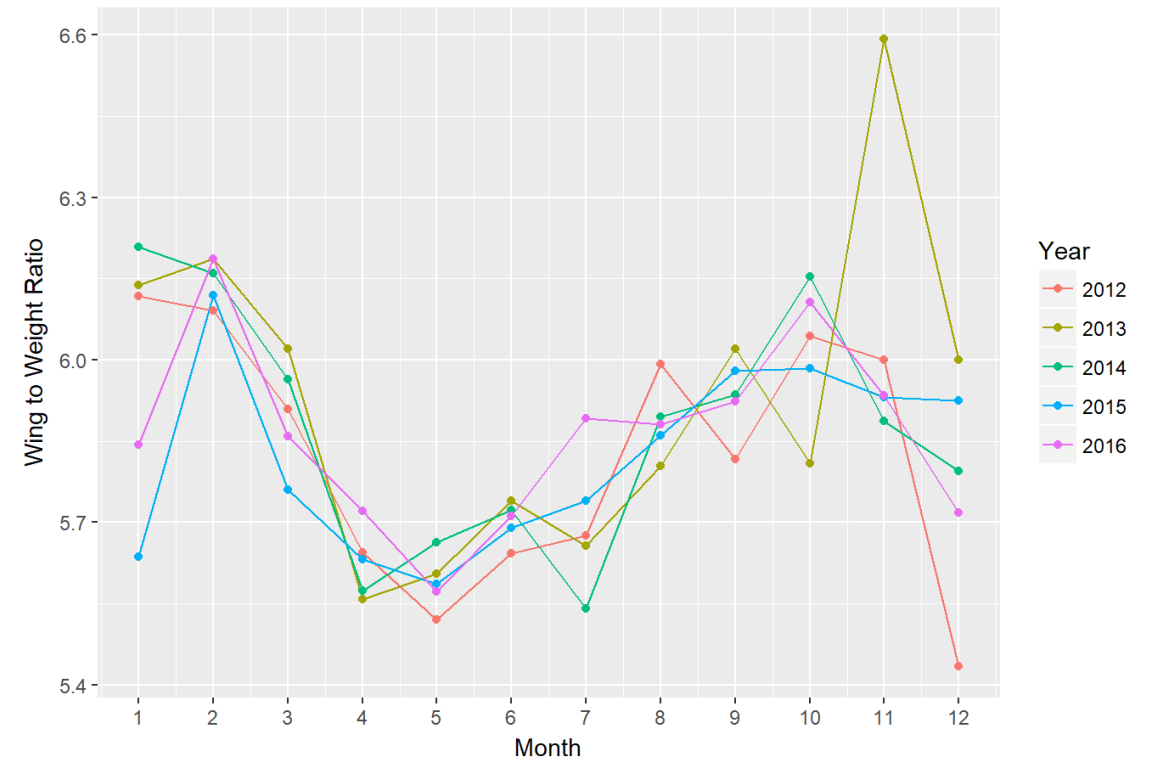
# Data Visualization

- Change in the average Wing to Weight Ratio of each species by month over the span of 5 years

Change in Wing to weight Ratio per month for Song Sparrow

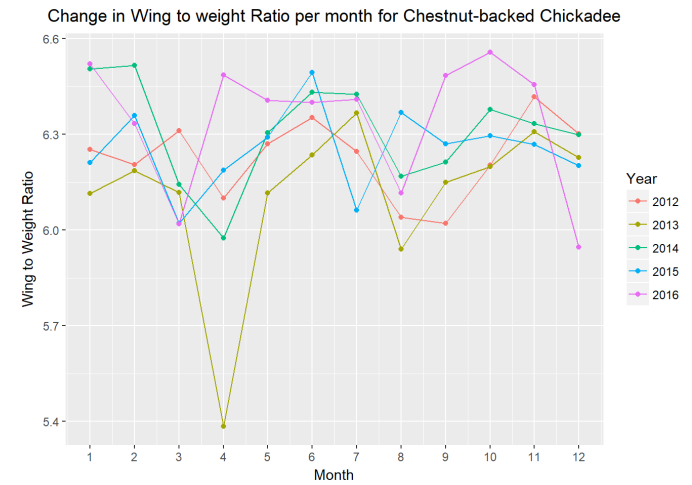
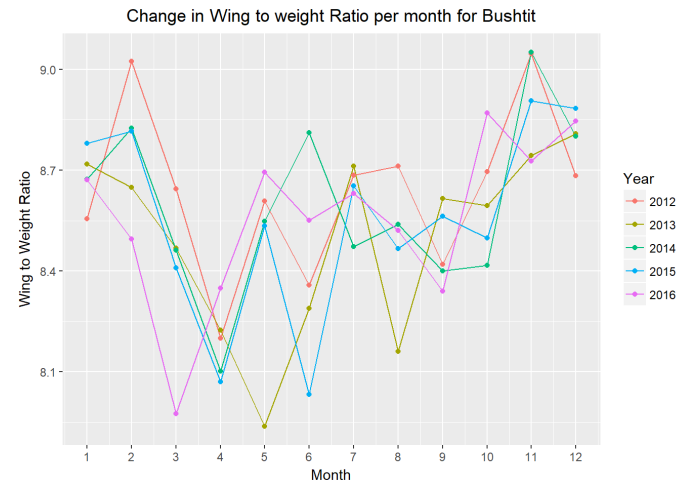
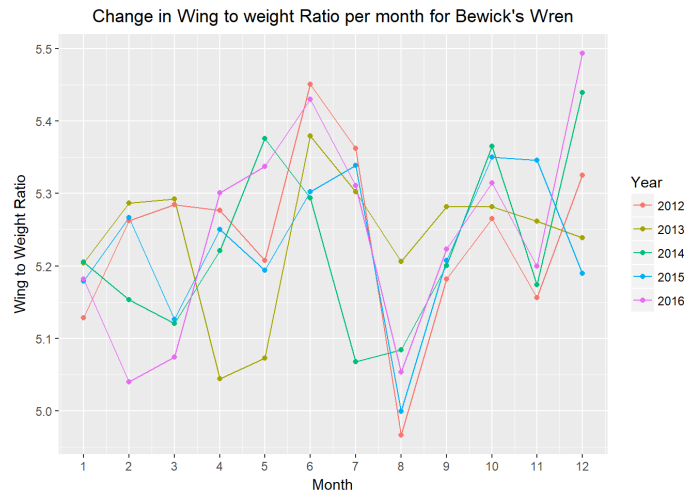


Change in Wing to weight Ratio per month for Common Yellowthroat



# Data Visualization

- Change in the average Wing to Weight Ratio of each species by month over the span of 5 years



# Limitations

- ▶ There were lot of unknown (N/A) in the sex column of birds, due to which the results of our sex ratio analysis might not be accurate.
- ▶ Change in the average weight of each species by month over the span of 5 years (2012 -2015) showed significant pattern changes. However, the pattern might have changed if we analysed older data.
- ▶ There was a lot of missing/inaccurate data in the years 1999 and 2002 due to which we had to delete data from those years to prevent any outliers.

# Interpretations from Data

- ▶ The population of Song Sparrows was significantly higher than other species, but has gone down rapidly since 2010.
- ▶ The number of sightings in summer (May to July) is higher than the number of sightings in other seasons.
- ▶ The average weight of all the 5 species have been constant for the past 20 years
- ▶ A pattern has been observed for weight changes over the year for some species.
- ▶ Measures should be taken to increase the population of song sparrow back to normal.



Questions?