ESM244 HW1 Task1

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Summary

Snowshoe Hare, *Lepus americanus*, is a species of hare found in North America, primarily in the northern boreal forests. It is a keystone prey species and can experience fluctions in population density. This analysis explores these fluctuations in a population of snowshoe hares in the Bonanza Creek Experimental Forest from 1999 to 2012. Data was collected by Kielland et al. from 1999 to 2012.

Citation:
Kielland K., F. S. Chapin, R. W. Ruess. 2017. Snowshoe hare physical data in Bonanza Creek Experimental Forest: 1999-Present. Environmental Data Initiative. https://doi.org/10.6073/pasta/03dce4856d79b91557d8e6ce2cbcdc14.

1. Plot snowshoe hare abundance between 1999-2012, group by sex

```
##### Wrangle the data to inclue variables of choice: sex and weight of snowshoe hares#####


### Total observations = 3380 (including all sex and NA values)
### Observations with KNOWN sex = 2628 (includes M, F, m, f)



#### Clean up DATE and extract YEAR

snowshoe$date = as.Date(snowshoe$date, "%m/%d/%y")

snowshoe$year = as.numeric(format(snowshoe$date, "%Y"))


## Get total abundance for snowshoe hare observations by counting up total observations by year
## Filtered out observations where the sex was unknown ******

# Get counts by year/sex
abundance <- snowshoe %>%
  select(year, sex, weight) %>%
    mutate(sex = case_when(sex =="M" ~ "Male",
                           sex == "F" ~ "Female",
                           sex == "f" ~ "Female",
                           sex == "m" ~ "Male"
                           )) %>%
  group_by(year, sex) %>%
  drop_na() %>%
  tally()

# Total observations for male/female
abundance_tidy <- snowshoe %>%
  select(year, sex, weight) %>%
```

```r
    mutate(sex = case_when(sex =="M" ~ "Male",
                           sex == "F" ~ "Female",
                           sex == "f" ~ "Female",
                           sex == "m" ~ "Male"
                           )) %>%
  drop_na()

# Plot Total Abundance
abundance_plot <- ggplot(abundance, aes(x = year, y = n)) +
  geom_line(aes(color = sex)) +
  ggtitle("Population Density of Snowshoe Hares in the \n Bonanza Creek Experimental Forest, 1999-2012") +
  theme_classic() +
  xlab("Year") +
  ylab("Number of Snowshoe Hares Recorded") +
  theme(plot.title=element_text(hjust=0.5)) +
  labs(color = "Sex")


abundance_plot
```

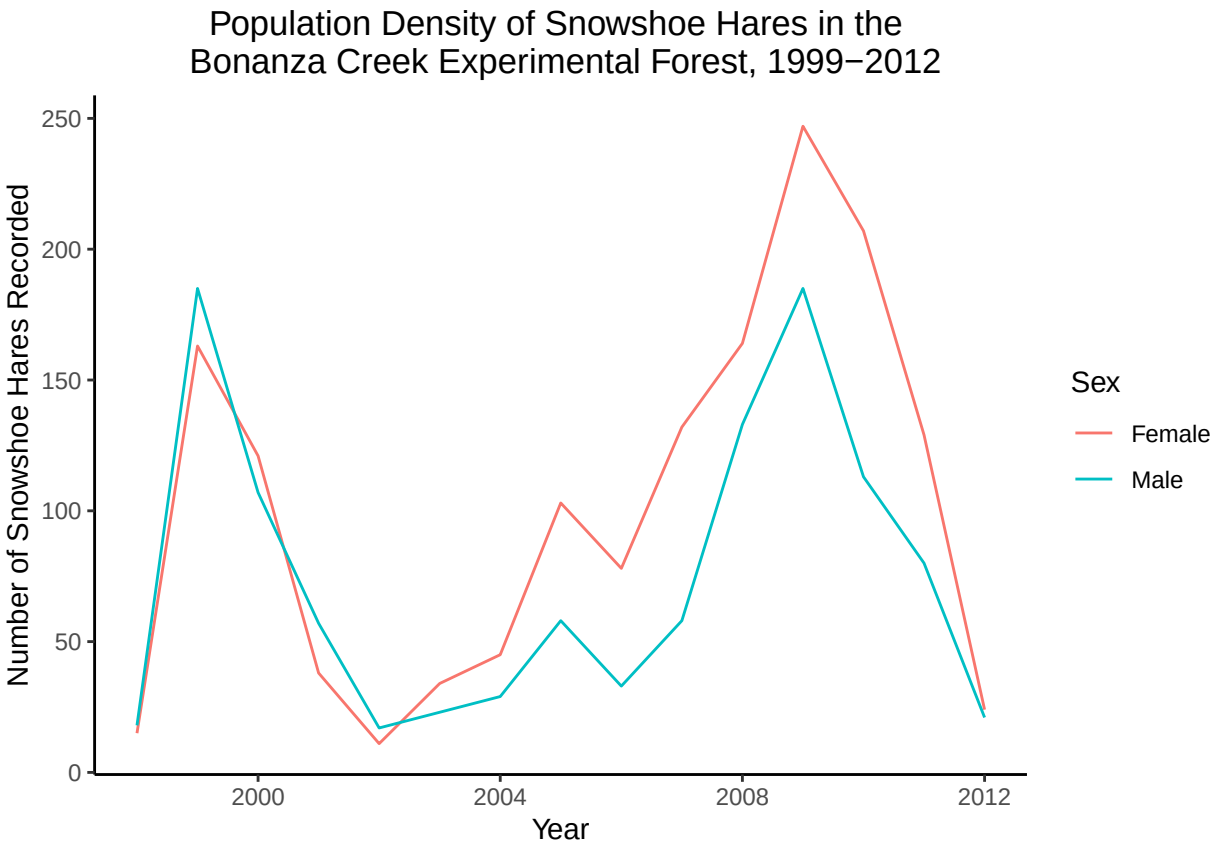

Figure 1. Population Density of Snowshoe Hares, 1999-2012. Capture and re-capture studies were conducted on a snowshoe hare population in Bonanza Creek Experimental forest between 1999 and 2012. Data was collected on the sex, weight, and highfeet length. This graph only shows data for snowshoe hares where the sex was confirmed. Total observations during the study period were n = 3380. Observations including hares with known sex is n = 2628.

```
### Create summary table for abundance
# total observations for male and female by year


abundance_table <- kable(abundance,
                         col.names = c("Year", "Sex", "Count")) %>%
  kable_styling(bootstrap_options = c("striped", "hover"),
                full_width = F,
                position = "float_right",
                fixed_thead = T
                )



abundance_table
```

Table 1. Population counts by year and sex.

Year	Sex	Count
1998	Female	15
1998	Male	18
1999	Female	163
1999	Male	185
2000	Female	121
2000	Male	107
2001	Female	38
2001	Male	57
2002	Female	11
2002	Male	17
2003	Female	34
2003	Male	23
2004	Female	45
2004	Male	29
2005	Female	103
2005	Male	58
2006	Female	78
2006	Male	33
2007	Female	132
2007	Male	58
2008	Female	164
2008	Male	133
2009	Female	247
2009	Male	185
2010	Female	207
2010	Male	113
2011	Female	129
2011	Male	80
2012	Female	24
2012	Male	21

2. Compare weights between male and female snowshoe hares

```
### Maybe show a map of study area??? Not sure how to get this


################################

### Show weight ranges over time by sex



##@ Show change in weight over time?
```