

Snowshoe Hare & World Climate Analyses

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Snowshoe Hares

Snowshoe hares, *Lepus americanus*, are a native species of rabbit in the boreal forests of Alaska. A Long Term Ecological Research project executed by the University of Alaska, Fairbanks, performed capture-recapture studies of this species between 1999 and 2012 to observe declines of hare population densities. The long-term study included measurements of snowshoe hair weights, the distribution of which are provided below. More information can be found at <http://www.lter.uaf.edu/data/data-detail/id/55>

Study Area



Lepus americanus, a keystone prey species in the Alaskan boreal forest ecosystem (photo: Sierra Club).



The long term study was located within the Bonanza Creek Experimental Forest about 25 miles southwest of Fairbanks, along a distributary of the *Tanana River*



The specific bounds of the study area are: 64° 24' 51.012" N - 64° 24' 49.176" N, and 148° 10' 22.908" W - 148° 10' 24.24" W

Data Processing

```
##Clean the Data

# Read in Data
snowshoe_df <- read_csv("showshoe_lter.csv")

# Select Sex, Weight, Hindfoot Ratio, and Grid
# Filter Information from Grid "bonmat", as Adequate Metadata for the Site is Unavailable
# Remove Rows Containing Questionable Sex
# Convert Grid and Sex Data to Lowercase
# Remove NAs from the Dataframe
snowshoe_clean_df <- snowshoe_df %>%
  select(grid, sex, weight, age) %>%
  filter(grid != "bonmat",
         sex != "?",
         sex != "M?",
         sex != "F?",
         sex != "m?",
         sex != "f?",
         sex != "pf",
         age == "A") %>%
  mutate(grid_l = str_to_lower(grid),
```

Table 4: Table 1: Summary of hare weights by gender

Adult Snowshoe Hare Weights in the Bonanza Creek Experimental Forest				
Sex	Mean (g)	Maximum (g)	Minimum (g)	Median (g)
F	1525	2365	720	1520
M	1443	2050	730	1460

```
sex_l = str_to_upper(sex)) %>%
select(-grid,
       -sex,
       -grid_l) %>%
na.omit()

## Summarize the Data
# Create a Summary Table of Mean Weight and Hind Foot Ratio for Each Sex
mean_table <- snowshoe_clean_df %>%
  group_by(sex_l) %>%
  summarise(mean_wt = round(mean(weight), 0),
            max_wt = round(max(weight), 1),
            min_wt = round(min(weight), 1),
            med_wt = round(median(weight), 1))

names(mean_table) <- c("Sex", "Mean (g)", "Maximum (g)", "Minimum (g)", "Median (g)")
```

Results

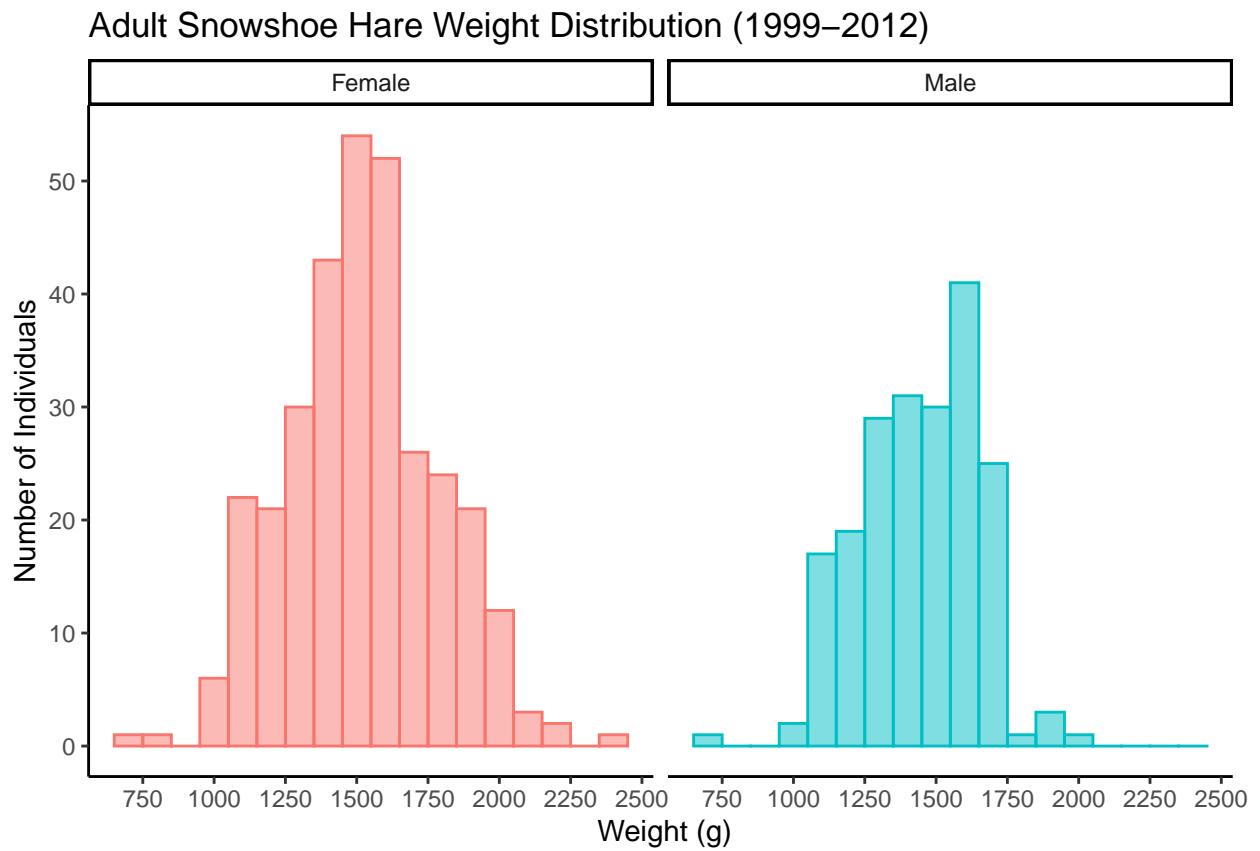
```
## Create a Table
summary_table <- kable(mean_table,
                       caption = "Table 1: Summary of hare weights by gender") %>%
  kable_styling(bootstrap_options = "striped",
               full_width = FALSE) %>%
  add_header_above(c("Adult Snowshoe Hare Weights in the Bonanza Creek Experimental Forest" = 5))

summary_table
```

While the smallest captured individual was a female, at 720 g, it is important to note that both the maximum, median, and mean weight for females are larger than those of the male hares.

```
## Create a Graph of the Data
labels <- c(F = "Female", M = "Male")

snowshoe_graph <- ggplot(snowshoe_clean_df, aes(x = snowshoe_clean_df$weight, color = snowshoe_clean_df$sex_l,
                                                fill = snowshoe_clean_df$sex_l), caption = "Figure 1: D
  geom_histogram(binwidth = 100, alpha = 0.5) +
  facet_wrap(~sex_l, labeller=labeller(sex_l = labels)) +
  scale_x_continuous(breaks = seq(500, 2500, by = 250)) +
  scale_y_continuous(breaks = seq(0, 60, by = 10)) +
  theme_classic() +
  theme(legend.position = "none") +
  labs(title="Adult Snowshoe Hare Weight Distribution (1999-2012)",x=" Weight (g)", y = "Number of Indi
```



When interpreting the graph, it is apparent that in general the females are heavier than male hares in the same region. However, it must be noted, that there are more females than males within the entire study.

World Climate PCA