## Ecological question

Does temperature, a known contributor of avalanche activity, have an effect on Coastal Alaskan Mountain Goat (Oreamnos americanus) mortality in avalanche related incidents?

## Data sources

Over a period of 17 years, 421 individual mountain goats were tracked to determine their presence in avalanche terrain regions, and whether or not an avalanche occurrence caused their death at both an individual and population level. Using the researchers tagging systems and GPS monitoring, they were able to determine each goats approximate age and exact death date. This data was collected by various wildlife researchers from university all across the state of Alaska in a 2024 published data set entitled “Long-term individual-based records of mountain goat mortality and terrain use in relation to avalanches in coastal Alaska during 2005-2022”.

In this I will be using the “mtn\_goat\_invdividual\_mortality\_db\_final\_2023\_0625” file with the “mtn\_goat\_individual\_mortality” sheet. Furthermore I will be using the columns “Avalanche\_Mort”, and “Date\_Death”.

* White, Kevin; Hood, Eran; Wolken, Gabriel et al. (2024). Long-term individual-based records of mountain goat mortality and terrain use in relation to avalanches in coastal Alaska during 2005-2022 [Dataset]. Dryad. <https://doi.org/10.5061/dryad.xsj3tx9ms>

Time series data set obtained from the Alaskan Climate Research Center, an organization under The University of Alaska Fairbanks, collecting temperature, precipitation, snowfall, and snow depth from 1941 to the present. Only mean annual temperature at the Juneau will be used in this correlational study, as this is the region at which the Mountain goats were studied.

In this, I will be using the sheet entitled “acrc\_USW00026451\_annual\_temp\_17” with the following columns to be analyzed: “Annual Maximum Temperature”, “Annual Maximum Temperature Date”, “Annual Minimum Temperature”, and “Annual Minimum Temperature Date”.

* <https://akclimate.org/data/time-series-data/>

## Scripting and statistical methods

I intend on comparing these two data sets by first creating a ratio of the amount of mountain goats dead caused by avalanches over the amount of goats alive. This will be done by creating a new column entitled “death rate” that will plot avalanche related deaths as they occur over time over the total amount of goats captured at the beginning of the study(no matter if their death was caused by an avalanche or not). This ratio will then be paired against a ratio of temperature over time by creating a new column entitled “Avg temp” which will plot Juneau’s average temperature per year. These new ratios will then be put into a new data frame called “goat study” where we can easily compare the two rations and run our statistical analysis. Therefore, in combining these two data sets with the aspect of time we should see what connects them together. This will be plotted on a line graph to best create a trend line to analyze the relationship between temperature and goat mortality. Example below. After this I will test these results on an AIC index where I will then hope to see a significant relationship between temperature and mountain goat morality. Furthermore, I will use a GLM, and a linear regression analysis to hopefully determine a correlation

A graph with handwritten text

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