The roles of climate and alternative prey in explaining 142 years of declining willow ptarmigan hunting yield

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Description of the data set

Year: Self explanatory

Period: we divided the 142 years of data into three periods: a first period with high peaks, low troughs and strong cyclic dynamics (1872-1900), a short second period with similarly high peaks but for most of the years less deep troughs and more variable cyclicity (1901-1916), and a third, long period with much lower peaks and faded cycles (1917-2013). These three periods were used when testing if drivers of variation in CPUE and growth rate had changed over time

CPUE: Catch per unit effort of willow ptarmigan. we use harvest statistics of willow ptarmigan, expressed as number of birds shot per hunter day, henceforth referred to as catch per unit effort (CPUE) (Rist et al. 2010), as a proxy for changes in the population of willow ptarmigan over the last 142 years. We have estimated one value for CPUE per year,

which represents the most common daily catch for that year. See the appendix of manuscript for the written source each of the annual CPUE values are retrieved from.

log.CPUE: Logarithm transformation of CPUE

Growth rate CPUE: growth rate is defined as the annual difference in CPUE on log scale

Peak rodent year: Peak rodent year is scored as "yes", otherwise "no". Occurrence of peak rodent years were extracted from four sources: 1871-1949 (Wildhagen 1952), 1932-1971 (Myrberget 1982a), 1971-1979 (Christiansen 1983), 1981-1985 (Frafjord 1988), 1986- 1989 (Selås et al. 2013), and 1990-2013 (Framstad 2017). Note that 1980 is missing as we were not able to find an estimate for this year.

NAO May_Jun_Jul: the mean North Atlantic Oscillation index for the months May through July, NAO_{mjj}, extracted from https://crudata.uea.ac.uk/cru/data/nao/ (Jones et al. 1997).

temp.PREINC, temp.INC, temp.HATCH, temp.BROOD, temp.WINTER, temp.SPRING, prec.PREINC, prec.INC, prec.HATCH, prec.BROOD

Prefix temp. means temperature and prefix prec. means precipitation. All these periods are described in the material and methods in the manuscript: Weather data (daily averages of temperature and precipitation) from spring and early summer were split into three biological seasons following Kvasnes et al (2014); pre-incubation (PRE-INC; 1st May to 2nd June), incubation (INC; 3rd to 24th June) and brooding and rearing (BROOD; 25th June to 15th July). In addition we tested the effect of mean temperature and precipitation in the week around mean hatching date (HATCH; 21-27th June; Henden et al. 2020), mean spring temperatures (March, April, May) and mean winter temperatures (Dec, Jan and Feb) following Bowler et al (2020). Weather data were retrieved from Ås, a weather station located at low altitude in southeastern Norway (seklima.met.no, Ås SN 17850; 59.6661° N, 10.7926° E).

Opening day hunt (julian day): The starting date of hunting season provided as Julian day (or Day of Year) (henceforth termed "opening day") varied throughout the study period. The

opening day was 15th August or 25th August, depending on region, from 1872 to 1899, 15th September in 1900 and 1901, 25th August from 1902 to 1922, 10th September from 1923 to 1926, 1st September from 1927 to 1931, 10th September from 1932 to 1950 (but with minimal hunting during WWII), 15th September from 1951 to 1987 and 10th September from 1988 and onwards. The opening day was predominantly in mid to late August up to the 1920's and 10th or 15th September in later years. This is relevant as the willow ptarmigan often flushes at shorter distances and can be easier to shoot in late August compared to early September (Loe and Hjeljord, pers. obs), although quantitative information for this is lacking.