

USING CLIMATIC DATA TO DEVELOP AN INDEX OF
WINTER SEVERITY AND RESPONSES BY LARGE MAMMALS^{TWS}

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Daily climatic data are obtained by Natural Resources and Conservation Service (NRCS), SNOTEL stations and National Weather Service (NWS), and climatological (CLIM) stations. SNOTEL sites are usually in mountain locations in western US and provide near-real time, year around, daily data on snow water equivalent (SWE), precipitation, maximum, minimum and average air temperatures (TMAX, TMIN, TAVG). CLIM sites are usually at valley locations and provide daily precipitation, TMAX, TMIN, TAVG and snow depth (SNWD). After all missing data are estimated by correlation with nearby sites, daily SWE and snow density are estimated at CLIM sites using precipitation, SNWD and TAVG. The Keetch/Byram drought index (KBDI), a soil moisture deficit model, and accumulated growing degree days are also computed. The Index of Winter Severity (IWS) for each winter range is calculated using SWE for the snow index, minimum temperatures below the effective critical temperature for each species for temperature index, and KBDI and growing degree-days for the winter forage index. The snow, temperature and forage indexes are weighted and combined to provide an IWS on a scale from +4 for the mildest of historic conditions to -4 for the most severe conditions. The IWS is one of the factors relating to mortality, reproduction and predation of big game animals. Accumulation of SWE on summer and transitional ranges is related to migration to winter ranges. Winter temperature, forage and SWE are related to declines in fat reserves and winter mortality.