# Update on Whiskey Mtn Lamb Study - June 28, 2000

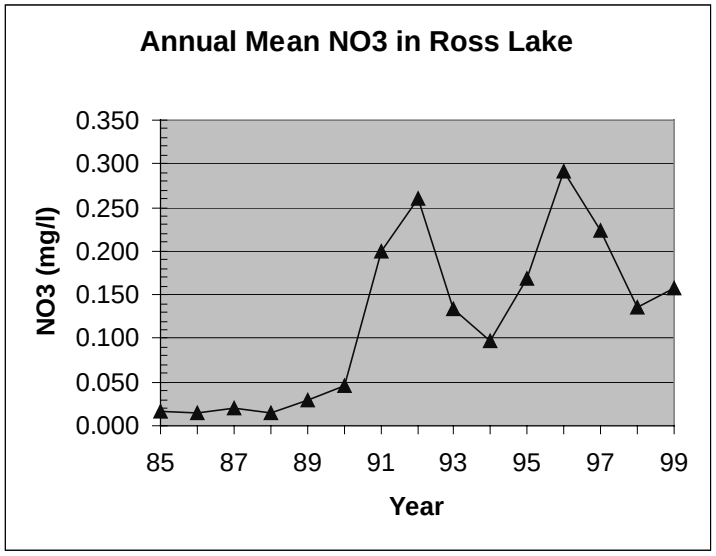
Pat Hnilicka

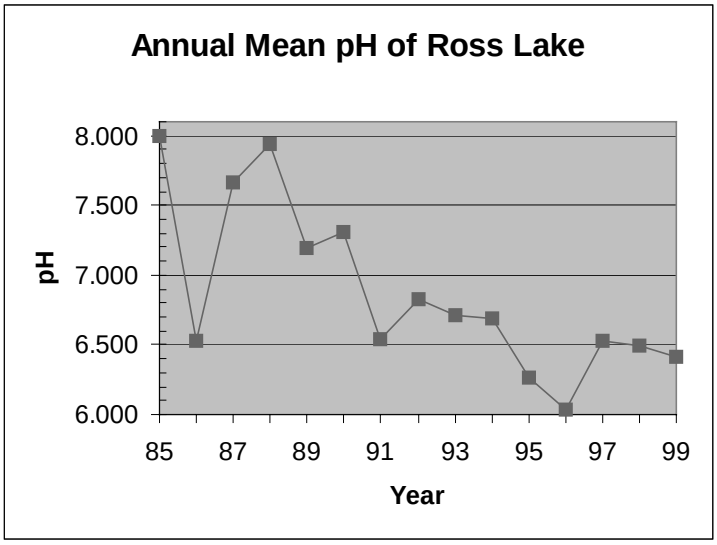
**Lamb Study:** John Mionczynski has been following sheep since late May. Ewes left lambing range very early (by June 7th) and headed to summer ranges. This is 3 weeks earlier than the previous 2 years. Most likely related to dry conditions on lambing range. Ewes, yearlings and lambs look very healthy. One lamb was sickly but was killed by a golden eagle soon after birth. Sheep have heavily used mineral blocks on Middle Mtn. Some ewes still looked pregnant as late as June 21st. This too was not observed the previous 2 years. John has been on Middle Mtn since early June and has 2 folks working for him. Joe Hutto, a wildlife biologist from Florida, will be taking over on Middle Mtn soon. Becky Lowe is also assisting John. John plans on training Joe, then heading over to Arrow Mtn for July. Plan is to remove 2 lambs from Arrow if lambs appear sick and analyze at the Vet lab for White Muscle Disease. Once that's done (probably by late July), plan is to place mineral blocks on Arrow Mtn and observe sheep health and movements. Predator scat analysis was completed for 40 scats collected in 1999 by Big Sky Labs in Montana. Of 16 lion or suspected lion scats, 7 had bighorn sheep hair (44%). Of 14 coyote or suspected coyote scats, 8 had bighorn sheep hair (57%). Of 10 other unidentified predator scats, 4 had bighorn sheep hair (40%). For all 40 predator scats, 19 had bighorn sheep hair (48%). Of the 40 total scats, 12 were comprised of 99% or more sheep hair (30%). The CSU lab (Terry Foppe) has not returned any analysis for the scats from 1998. I called today and she said she still has them and will have them done next week (…I'm not holding my breath).

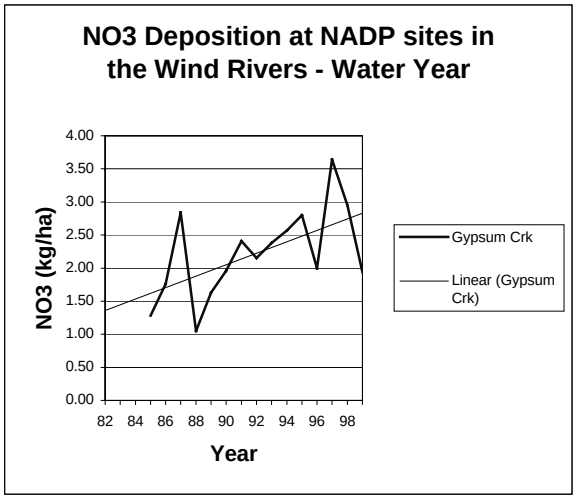
**Selenium Forage Study:** A selenium forage study is underway. Goal is to determine the effects of dry and wet years on selenium uptake by alpine plants. Soils work done by Bruce Mincher, chemist that was also past President of the Idaho Safari Club and who's raised money for this project, indicated that the selenium in Middle Mtn and Whiskey Mtn alpine soils is most likely in a form (selenite) that is not very available to plants due to acidic conditions. Selenite is water soluble and thus available to plants, but it binds with iron compounds in the soil and thus is not so available for uptake. Selenate is also water soluble and exists in less acidic soils (like those on Torrey Rim and in Torrey Valley). It does not bind to iron compounds. In 1998, a very wet year, alpine forage had selenium levels of only 5 ppb. In 1999, a very dry year, levels jumped 11 fold to 57 ppb. In 1998, we had poor lamb survival in the non-study groups (BLM Ridge and Sheep Ridge). In 1999, we saw much higher survival. Could this be related to the increase in forage selenium? Bruce asked if we had an acid rain problem in the Winds. I looked into this further and found some really interesting stuff: Water sampling by the Shoshone Nat'l Forest shows increasing nitrate levels ($NO_3$) in Ross Lake since 1985 (nitrates make water and soil more acidic). Concurrently, pH of Ross Lake water was decreasing (that is, becoming more acidic). Graphs are on the next page. Also, NADP sites around the Winds (these are acid rain monitoring stations) show increases in nitrate deposition. These sites are located near Pinedale, Gypsum Creek, South Pass and Sinks Canyon. The Gypsum Creek site is located immediately upwind (south-southwest) of Middle Mountain and only 20 miles distant. The NADP sites are all at much lower elevation and precipitation zone than Middle Mtn. Acid Rain research that I've read indicates that there is an increase in nitrates in surface water at higher elevations because of higher amounts of precipitation and lower buffering capacity of soils. Therefore, acidification of soils is much greater at higher elevations. Finally, glacial ice coring done by Dave Naftz shows major increases in nitrates in recent years. He has a chemical breakdown of a 180-meter core of ice taken out of Fremont Glacier that shows nitrates increasing 10 fold in glacial ice in recent years. He is not certain how much of this is related to increasing nitrates falling from the sky or from an "elution" effect (that is, nitrates being washed out of lower ice levels by meltwater, thus making the more recent years look really high). He's looking into this and will know more next year. So what all this might mean is that in wet years soils are more acidic due to higher amounts of rainfall

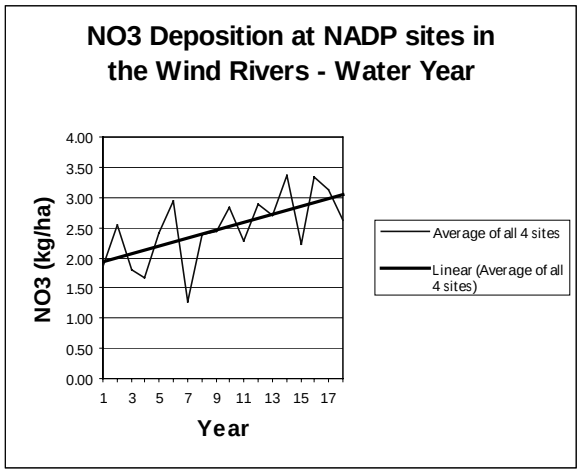
and thus higher amounts of nitrates. In theory, more rainfall and more acidity makes selenium less available for plants to uptake (like 1998).

To see if this is really happening, Joe Hutto will be monitoring 6 different forage plots on Middle Mtn this summer. Two plots are "overwatered" (they will receive additional rainwater that has been collected by tarps). One will receive 2X rainfall, the other 4X. There is one control plot that receives no additional water. There are 2 plots that are screened by green house material. The design is such that temperature under the material is the same as outside and yet rainfall will not reach the plots. These "underwatered" plots will receive 1/2X and 1/4X the amount of rainfall. A final plot that is also screened will receive the same amount as rainfall, but will be water with distilled water. Each plot will be divided in two. One half of the plot will be clipped now, and then regrowth will be clipped in late July and in late August. The other half of each plot will only be clipped in late August. This will allow comparisons of selenium uptake at several different times, under varying rainfall conditions and whether it's the water or acidity in the rainwater that affects selenium uptake. Recent literature from Japan showed that selenium uptake by soybean and tomato plants was 1/4$^{th}$ as much in acidic soils (pH 4.2) than more neutral soils (pH 6.4). Joe will also monitor pH of rainfall as well as soil pH on all plots. Hopefully we'll learn something interesting. This could answer the question of what has changed geologically such that now see a selenium or other mineral deficiency in sheep.




NO3 Deposition at NADP sites in the Wind Rivers - Water Year
NO3 (kg/ha)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
82 84 86 88 90 92 94 96 98
Year
Gypsum Crk
Linear (Gypsum Crk)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Year
Average of all 4 sites
Linear (Average of all 4 sites)