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A “hot off the press” review paper by Svejcar et al. (2014), not available when the DEIS was being written, acknowledges that “Because grazing is a complex ecological process, synthesis of scientific literature can be a challenge.” The authors (27 prominent range scientists from 10 western states) also opine that “Legacy effects of uncontrolled grazing during the homestead era further complicate analysis of current grazing impacts...” The authors maintain that, although there are areas on the landscape where grazing impacts can be identified, there are also vast grazed areas where impacts are minimal. Over the last 20-50 years land managers have actively sought to bring populations of native and domestic herbivores in balance with the potential of vegetation and soils (Svejcar et al. 2014)

Regarding livestock grazing of meadows and riparian areas, the cautionary tone of the document is understandable, but great strides have been made in the last two decades to address grazing issues in these areas. That said, the use of livestock as a tool for meadow enhancement is documented in literature, but essentially ignored or mentioned without appropriate citations in the DEIS. As an example, Chapter 4, p. 83 includes the following statement that should be buttressed with literature citations: “Disturbance such as that created by livestock grazing may be required to increase forb diversity (note that forb diversity on meadows can increase with grazing).” **Studies by Neel (1980), Klebenow (1982), and Evans (1986) demonstrated that cattle grazing can be used to stimulate forb production. These studies were all conducted in Nevada, focusing on livestock use of upland meadows frequented by sage-grouse.** Also, in Chapter 4, p. 86, the following statement is very incomplete:

“Long-term impacts of no grazing on riparian plant communities are less clear. Some studies show that plant productivity, especially in meadows, can decline over time in the absence of grazing (Bryant 1985). However, in a review of the literature on the subject, Belsky (1986) concluded that strong evidence for a positive relationship between herbivory and plant fitness is lacking (Belsky 1986). Thus, no livestock grazing would likely be positive to riparian areas and wetlands initially, but long-term impacts are less certain.”

**What the DEIS fails to mention is that Evans (1986) and Klebenow (1985, 2001) reported that sage-grouse use of moderately grazed meadows was higher than their use of both ungrazed meadows and heavily grazed meadows. Oakleaf (1971) acknowledged that grazing should be used as a tool for meadow enhancement, warning however that heavy grazing would be detrimental.**

**Other examples of pertinent grazing management literature missing from the DEIS are as follows: [Please note that this list is not yet complete]**

Bates et al. 2009 – Concluded that properly applied livestock grazing after low severity prescribed fire will not hinder the recovery of herbaceous plant communities in Wyoming big sagebrush steppe.

Knopf 1996 - Season of grazing is more important than intensity of grazing. Late-season grazing on dormant vegetation has little effect on bird communities (Knopf 1996).

Johnson et al. 2011 - Moderate and low stocking rates of cattle grazing on bunchgrass communities in northeastern Oregon caused no negative impacts to ground-nesting songbirds. These stocking rates generally provided suitable habitat for all species studied and results were similar to the no grazing treatment.

Whitehurst and Marlow 2013 – In mountain big sagebrush habitat, higher forb nutrient density that is critical for pre-incubating sage-grouse hens and survival of young broods can be achieved with targeted cattle grazing and selective thinning of mature mountain big sagebrush stands.

West et al. 1984 - Found no significant increases in perennial grasses with long-term rest and cautioned managers that livestock exclusion will not result in a rapid improvement of native herbaceous component on sites dominated by woody vegetation.

Sneva et al. 1984 - Noted some slight increases in perennial grasses with thirty years of livestock exclusion in the sagebrush steppe, but this increase was less than what occurred on an adjacent grazed site, and after 35 years grass frequency had become slightly higher on the area outside the enclosure. The authors concluded that direct reductions in sagebrush would be required to greatly increase perennial grasses.

Holechek & Stephenson 1983 - Sagebrush communities in New Mexico rested for twenty-two years compared to moderately grazed areas had minimal vegetation differences and the differences that did occur included greater perennial grass cover in the grazed areas. This suggests that moderate grazing may have been beneficial. Thus, it remains unclear if long-term grazing rest will facilitate increases in the perennial herbaceous understory in communities with dense sagebrush overstories.

Laycock 1967 - found that fall grazing (with sheep) and grazing exclusion resulted in a 30% increase in production of perennial grasses and perennial forbs compared to spring use. In this case, a change in the timing of grazing had the same effect as the long-term exclusion of grazing.

**In addition to pertinent grazing management literature that is missing in the DEIS, another concern is the inappropriate contextual interpretation of some cited literature.** As a case in point, there is mention in Chapter 4, p. 15 that “livestock may also trample nests and disturb GRSB behavior (NTT 2001, p.14).” Certainly livestock may trample sage-grouse nests, but the magnitude of the issue is highly questionable. Reference is apparently to Beck and Mitchell 2000, which was cited in both the NTT report (NTT 2011) and the more recent USGS/BLM

report (Manier et al. 2013), which stated. "...sheep and cattle trampled nests and caused nest desertions (Beck and Mitchell, 2000)." The information in Beck and Mitchell was cited from a single article by Rasmussen and Griner 1938. Our search of this document showed that, of 41 nests impacted by various causes, 2 (4.9%) were destroyed by livestock, 23 by carnivores, 7 by ravens, 7 by undetermined causes, and 2 by human causes. This same study found 23 deserted nests, 5 (21.7%) of which were attributed to livestock. For proper context we must also acknowledge that ravens have increased dramatically since the 1930's, livestock numbers have decreased dramatically since the 1930's, and livestock grazing has changed from season/year-long to managed systems that defer or rest much of the landscape from grazing during the sage-grouse nesting season. For ground nesting birds in general, Schultz (2010), by way of literature review, concluded that there is "limited experimental science about the effect of livestock on nests and eggs and virtually none comes from sagebrush-grass plant communities. A review of published research suggests that while trampling is possible, the conditions under which it occurs probably are uncommon on the large grazing allotments that typify the low production western rangelands, composed of shrubs and perennial grasses."

**A few more comments are also in order. Based on input from Dr. Sherm Swanson (UNR Range Ecologist), the DEIS focus on utilization, apparently as an objective in some cases, is largely in appropriate.** Specifically in regard to Table 2.7, focusing management on allowable use levels where not meeting objectives is putting the emphasis of grazing management on a weak tool. It also focuses management on grazing where grazing may or may not be the driving management problem or opportunity (If this is not intended, the caption needs to be changed). Most of the habitat objective issues identified in Table 2.6 (or its revised version) are not caused by current grazing management. Many of the habitat objectives identified in table 2.6 are caused by an inappropriate fire regime. Many that were caused by grazing will not be remedied by simply fixing grazing. As Wyman et al. (2006) and Swanson et al. (accepted with revision 2014) point out, utilization is important in places where the seasons of use are relatively long. However, utilization is much less important in riparian area management if and where grazing seasons are short and allow substantial parts of the growing season for plant recovery through growth or regrowth. Furthermore, requiring utilization levels such as these de-motivates ranchers and range management specialists to find solutions that will work much more effectively. Those solutions, taught in the interagency Nevada Range Management School (led by Cooperative Extension, and including team members from the NRCS, BLM, USFS, EPA, and the ranching industry), are founded on plant growth science and grazing management based on season and duration of use (McAdoo et al. 2010). These management principles are especially appropriate for large pastures (which were not the focus of Briske et al. 2008) that are typical in sage grouse habitats.

The terms and conditions column suggests that agencies will have people out monitoring in mid-season and this has repeatedly not worked. Where utilization is needed because of longer grazing seasons, a better approach is to have triggers to help ranchers see when to move animals followed up by end point indicators for quantitative monitoring. Both were described in the Nevada Rangeland Monitoring Handbook (Swanson et al. 2006) adopted by the BLM and USFS, along with other state and federal agencies in 2007. Both should be based on local considerations

including season and duration of grazing, objectives, vegetation type, the amount of rest built into the system etc. If the intent of the Table 2.7 approach is to provide incentive to have grazing make progress toward objectives (if other grazing management can get to the objectives then grazing utilization can be more flexible), then the approach should be targeted at only those objectives for which grazing is relevant and where current or recent grazing management is the cause of the problem. Even then, an alternative more powerful strategy would strengthen the incentive as a tool for effecting progress. **This more powerful strategy is to avoid stressing the important forage plants by either: (1) Utilization levels such as those proposed OR (2) Short use periods with no livestock grazing during substantial parts of the growing season and use periods at different seasons in different years.** These ideas are taught in Range Management School and Cooperative Permittee Monitoring workshops around Nevada, using the Grazing Response Index (USDA USFS, 1996) described in the Nevada Ranchers' Monitoring Guide (Perryman et al. 2006).

Also, according to Dr. Swanson, the language "No grazing from May 15 to August 30 in brood rearing habitat" precludes important tools for improving brood rearing habitat. Grazing repeatedly in September is likely to damage the physical functioning of riparian areas, especially in large pastures with limited riparian waters/areas. Grazing before May 15 may cause riparian areas to not be grazed because upland forage is preferred then (Swanson et al (accepted with revisions 2014), and some late spring to early summer grazing benefits sage-grouse by managing forb phenology, nutritional value to chicks, and availability (Evans 1986). The problem with grazing in riparian areas and wet meadows is not that sage-grouse are directly impacted by cattle use at the time that sage-grouse use these areas. The problem is that poor grazing management causes riparian areas to lose functionality and other resource values. To address this problem there are many tools. As described in Swanson et al. (accepted with revision 2014), the need is for more generally successful tools to be used than generally unsuccessful tools. On balance there must be more recovery than damage over the length of the grazing rotation cycle. This management must keep the plants healthy so they can have strong roots and go through succession toward more riparian stabilizers or maintain an adequate amount of riparian stabilizers.

Precluding grazing from May 15 to September 1 is very clearly overkill as demonstrated by the diversity of successful methods applied in the Elko BLM District and elsewhere across the nation. Managing this problem with only utilization standards would be overkill (because it is often unneeded), distracting (because it emphasizes a weaker tool while other and better approaches lose focus from lack of assurance) and ineffective (because it has proven to not be effective in practice where agencies cannot afford the personnel to monitor adequately and then lose budgets because the fights are unproductive). The policy needs flexibility to use strong tools and certainty that strong tools will be used. So far this Table 2.7 widely misses the mark. It will likely be the subject of numerous law suits and it is contrary to what has been taught in Nevada and across the West by the BLM/FS National Riparian Service Team and by the Nevada Range Management School for almost a decade.

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