

## Guidance for haying activities in the Nevada CCS:

Protecting and conserving mesic areas has been identified as high priority for sage grouse conservation (Connelly 2016). Mesic areas are a limiting factor in Nevada and a significant amount are located on private land including mixed community pastures that may be harvested for hay. Much anecdotal data has been shared regarding sage-grouse use of cultivated fields and pastures, however science-based studies are unavailable regarding sage grouse utilization and the effect of cultivation on sage grouse. Based on available literature, the SETT has the following requirements and recommendations for haying activities.

### Requirements:

- **Flushing bar:**  
Mechanisms installed for the purpose of flushing concealed birds in advance of harvest machinery have been a common tool used to lower harvest related mortality (English 1934, Klonglan et al. 1959, Lehman 1946, Labisky 1957). The SETT requires the installation and use of a flushing bar to reduce machine related mortality. Many resources exist for designing and constructing flushing bars and the design may ultimately depend on the type of machinery used. The following link may provide useful design suggestions:  
[https://www.nrcs.usda.gov/wps/PA\\_NRCSCconsumption/download?cid=nrcseprd601408&ext=pdf](https://www.nrcs.usda.gov/wps/PA_NRCSCconsumption/download?cid=nrcseprd601408&ext=pdf)
- **No organophosphate pesticides:**  
Blus (1989) and Connelly and Blus (1991) have documented significant sage grouse mortality directly after spraying organophosphate pesticides. The CCS will not allow application of these pesticides (e.g., chlorpyrifos, dimethoate, pyrethroid, etc.).
- **Seed Mix:**  
The science regarding forage crop mixtures is immense and widely available. There are many considerations to evaluate seed decisions, however diverse plant community structure is documented to have a wide variety of benefits to production agriculture and ecological services. The goal of the CCS is to maintain and promote diversity in project areas. Existing diversity should be maintained, and plantings that aim to reduce diversity are not permissible. Seed mixes that enhance diversity and include grasses with legumes are encouraged. Monoculture plantings of Alfalfa (*Medicago sativa*), Sanfoin (*Onobrychis viciifolia*), or clover species (*Trifolium*) will not be included in CCS project areas.
- **Low speed:**  
In order to lower potential machine related mortality, speeds at which birds may escape are recommended. There is no research currently which could guide exact speeds.
- **6-inch stubble height within 60 meter buffer:**  
Mesic sites with greater herbaceous material and an increased invertebrate community have been shown to be important late brood rearing habitat. (Kaczor et al. 2011) Increased grass height in these sites have also been shown to be important for concealment from predation (Gregg et al. 1994, Herman-Brunson et al. 2009, Schreiber et al. 2015). Little research has been done on intensively managed agricultural fields to determine the effect of harvest on sage grouse recruitment. While it is possible that harvesting may provide greater access to

invertebrate communities (Kaczor et al. 2011, Jamison et al. 2002), it is incontrovertible that harvesting will also reduce cover and concealment opportunities. Mabray and Conover (2015) suggested that late brood rearing habitat selection relates more strongly to concealment than food availability. Thus, habitats that offer concealment which are then harvested represent a risk. To address predation risks, a 6-inch stubble height is required within 60 meters from the edge of the field (Connolly et.al. 2000). Stubble height may be any height desired when greater than 60 meters from the edge of the field.

#### Recommendations:

- **Swathing strategies:**

To avoid potential machine caused mortality, the SETT recommends strategies to mitigate impacts on birds in the field. For example, beginning swathing on the inside of a field, and moving out, or starting at one end of the field and moving to the other. Moving from the outside to the inside in ever-decreasing circles may serve to concentrate birds in the center of the field, although the propensity for sage grouse to do this is unknown (Bollinger et al. 1990; Frawley and Best 1991; Green et al. 1997; Tyler et al. 1998).

- **Harvest Timing:**

Sage Grouse broods often forage diurnally, with midday hours being spent in more shrub type environments (Sveum et al 1998, Schrieber et. al 2015). In order to limit impacts, harvesting during brood-rearing season (June 15<sup>th</sup> – September 15<sup>th</sup>) should be avoided if possible during peak foraging hours: Sunrise – 10:00 AM, and 5:00 PM to half-hour after Sunset.

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