

EFFECTS OF HAYING AND NON-USE
ON FLOOD MEADOW VEGETATION

C. M. Britton and F. A. Sneva

Management of flood meadow vegetation appears to have dramatic effects on the ability of these areas to produce and the species composition of what is produced. The need to document these changes and their magnitude became apparent when the Malheur National Wildlife Refuge initiated a program of non-use management. The opinion was that certain bird species required residual vegetation as a habitat component during specific time intervals of their life cycles. Although the size of area, distribution, and physical characteristics of this residual vegetation cover are not well defined, the management to produce residual cover is strict non-use of the vegetation. This non-use includes both grazing and haying.

The objectives of this study were to compare an area that was hayed to an adjacent area that had no use. This comparison was through measurements of herbage yield and plant species composition.

EXPERIMENTAL PROCEDURES

The study area was on the Malheur National Wildlife Refuge, about 30 miles south of Burns, Oregon. A portion of a field which had a history of being hayed was divided, with one treatment being non-use and the other being hay. Haying was done each year during the first week of August and the hay was removed.

Estimates of herbage yield were made by clipping 20 quadrats on each area. Clipping was done three times each year over the three-year study. Within each year, the first harvest was in early spring before growth started. In mid-July, the maximum standing crop of herbage was measured and in October, the final measurement was made after the plants had become dormant. In mid-July, species composition was measured using a 10-point frame with 1,000 points examined on each area. Plants were grouped into four categories as grass, forb, *Carex*, and *Juncus* species.

RESULTS AND DISCUSSION

The effect of non-use on plant growth and the resultant herbage yield was dramatic. In 1976, maximum yield on the two treatment areas was similar at slightly more than three tons per acre (Figure 1). Growth on the non-use area after one year was cut almost in half to a level of two tons per acre. At the same time, the hayed area produced more than three tons per acre. This trend continued into 1978 as the yield on the hayed area approached four tons per acre while yield on the non-use area dropped below two tons per acre.

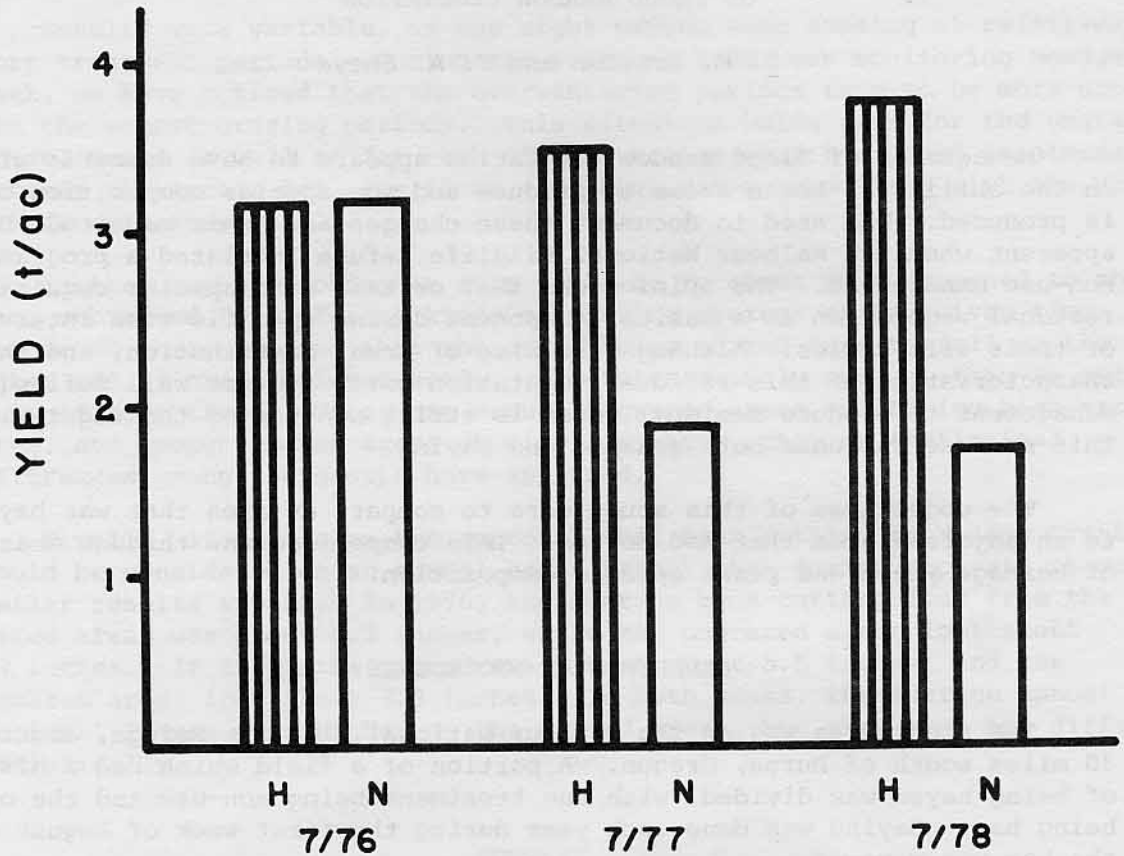


Figure 1. Effect of haying (H) and non-use (N) on herbage yield during three consecutive years.

The primary impact of non-use on yield is the accumulation of litter on the soil surface. This mat of plant material prevents plants from growing on relatively large areas. When the weight of litter on the soil surface was added to the yearly plant yield, the total was about the same as new growth on the hayed areas.

Changes in species composition were evident as a result of non-use management (Figure 2). *Juncus* species increased rapidly on the non-use area. In 1977, after one year in non-use, *Juncus* species more than doubled and by 1978, they had tripled as compared to the initial condition. On the hayed area, *Juncus* species remained at about 18 percent of the total composition. Grasses decreased on the non-use area and increased on the hayed area in 1977. This shift in composition on the hayed area probably was caused in part by dry conditions which prevailed in 1977. During the wet year of 1978, grass composition was reduced on both areas. *Carex* composition on both areas was lower than the initial condition measured in 1976. The lowest composition

measured in 1977 was a drought effect but with the wet year of 1978, the composition did not return to the initial condition level. Forb composition was variable, although there was a three-fold increase during the dry year of 1977.

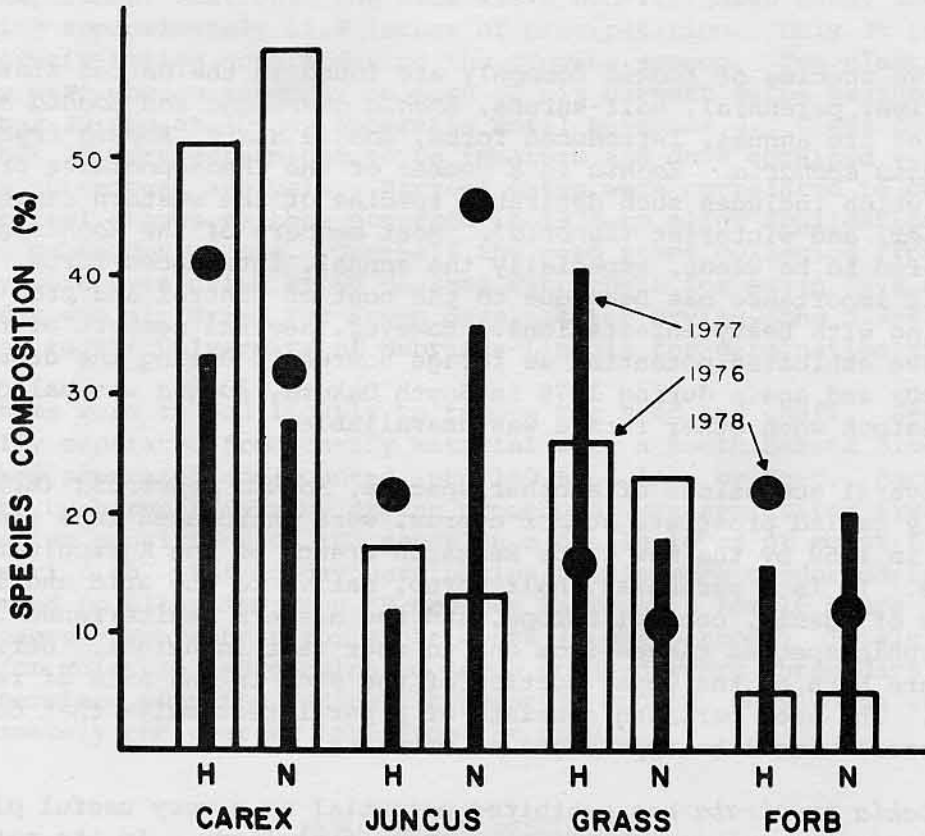


Figure 2. Effect of haying (H) and non-use (N) on percent species composition during three consecutive years.

Non-use management has a pronounced effect on flood meadow vegetation. The clearest impact was the reduction in growth from litter accumulation on the soil surface. *Juncus* species increased with this non-use management.