

# Delayed grazing may improve upland waterfowl habitat

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Only about 13 percent or some 180,000 hectares remain of the natural wetlands that existed in California before it was settled. Most of that is on public land, and over three-fourths of the public wetlands are in Modoc County.

Prime nesting areas for migratory waterfowl are limited to rice fields in the Central Valley and wetlands of northeastern California. During the 1977-78 hunting season over 2 million ducks and 200,000 geese were bagged statewide, making hunting a highly valued resource.

Mallards, pintails, and cinnamon teal nest in the spring on upland areas surrounding wetlands and require residual vegetation (dead herbaceous growth from previous years) for nest-building material and nesting cover. In the Modoc National Forest, which has about 13,860 hectares of wetland habitat, most of the adjacent uplands lack adequate residual cover, because they are inherently low in productivity and are grazed preferentially by domestic livestock.

Livestock grazing is a primary use of Modoc National Forest rangeland, where managers allocated over 120,000 animal-unit-months in 1978. This amounts to forage for about 27,000 cow-calf pairs on the range for the normal 4.5-month grazing season (15 May to 30 September). Wetlands provide large amounts of forage that can and should be harvested by livestock, but where there is a high potential for waterfowl production, grazing management should be designed to establish and maintain important constituents of waterfowl nesting habitat. One alternative to the typical season-long grazing pattern is delayed grazing, which keeps livestock off during the greatest duck nesting activity, improves the vigor of cool-season perennial range grasses, may allow greater use of wetland forage, and is more acceptable to ranchers than total rest for the range.

Seasonal plant production and cattle preferences, both of which influence residual vegetation, for major vegetation types during season-long grazing were compared with those during a delayed grazing season. Two representative areas containing wetlands and surrounding uplands in the Modoc National Forest were fenced in 1978 and grazed with

cow-and-calf pairs. One 2,510-hectare pasture was grazed season-long, and the other 1,130-hectare pasture was grazed at a similar stocking rate but from 15 July until the end of the regular season.

## Vegetation sampling

Five major vegetation types were mapped on each pasture, four on the uplands, plus the wetland areas: low sagebrush (*Artemisia arbuscula*); silver sagebrush (*A. cana*); pine-juniper-shrub (P-J-S, dominated by *Pinus ponderosa*, *Juniperus occidentalis*, and *Artemisia tridentata*); pine plantation (*P. ponderosa*); and wetland (dominated by common spike-rush, *Eleocharis palustris*).

Plots within each vegetation type were clipped to estimate herbaceous plant standing crop during three monitoring periods in late spring, summer and late summer. Grasses and grasslike plants were hand separated by species, and forbs were lumped together as a class.

## Cattle habitat preference

Aerial surveys at about four-week intervals throughout the grazing season monitored cattle occurrence in the various vegetation types.

Occurrence data alone do not account for the relative areas of each vegetation type in the two grazed pastures. In other words, the cattle may be spending time in a particular vegetation type simply because that type is more available and not because of preference. A preference index was therefore devised to account for availability.

## Low sagebrush

Maximum herbaceous plant production in the low sagebrush vegetation type occurred in late spring. The dominant species are cool-season grasses that begin spring green-up as soon as temperature and moisture allow. Ephemeral forage producers, the annual and perennial spring forbs, also contribute to this early forage but dry out and decompose naturally as temperatures rise and the soil dries. Total herbaceous standing crop was 14 percent lower in summer than in late spring because of a significant decline in the number and amount of forbs.

Perennial grasses typically are coarser and more upright-growing plants that do not rapidly decline in standing crop by decomposition as the season progresses. As a result, the early cool-season grasses are the most important source of residual vegetation, providing nest-building material and nesting cover for waterfowl in spring and early summer. By late summer, livestock and other consumers had used a portion of the available forage, and average standing crop of residual vegetation in late summer was 62 percent of the late spring level; 38 percent had been consumed. In comparison with the season-long grazed pasture, the delayed grazed area had about 13 percent more residual vegetation on the most important, low sagebrush, vegetation type.

On the pasture grazed season-long, cattle use of the low sagebrush habitat was greatest early and late in the grazing season (fig. 1). Their preferences can be explained, in part, by the availability of succulent forbs and cool-season grass forage combined with cool temperatures early in the season and fall regrowth of the grasses later.

An advantage of early-season grazing on this type is that crude protein contents of the two major low sagebrush grass species are at high levels. Protein values of these grasses drop dramatically as the season progresses.

Figure 1 shows that cattle moved out of the low sagebrush from mid-May to the end of June when the area began to dry out and the plants became less palatable. On 27 July no cattle were seen in low sagebrush. Wetlands, at that time relatively cool and with abundant forage, became heavily used.

Low sagebrush areas again became attractive in late August through September. Temperatures declined from mid-season highs, wetland vegetation was drying out, and fall rains enabled regrowth of upland perennial grasses. With increased use of the upland areas, residual vegetation was reduced.

Cattle in the delayed-grazing pasture used the low sagebrush habitat in a pattern similar to the season-long use, but the lowest cattle occurrence was in August (fig. 1). Cattle preferences for the low sagebrush were similar for the last two sampling dates on both pastures (fig. 2), although cattle

occurrence in low sagebrush late in the season was 50 percent lower on the delayed than on the season-long pasture. The 27 July observation showed the main difference, when the low sagebrush area was preferred under delayed grazing, whereas no use was recorded under season-long grazing. This might be explained by the fact that cattle had not yet grazed the area that year and could be highly selective.

### Silver sagebrush

The silver sagebrush vegetation type was not sampled for herbaceous plant production, because it made up less than 8 percent of the area of the two pastures. With season-long grazing, silver sagebrush areas were preferred and used most heavily at the 31 May and 22 August observations. The high early-season use corresponded to that on the low sagebrush type. The dominant grasses were immature and quite palatable, and the large quantity of forbs probably stimulated cattle use observed on 31 May.

As the weather became hotter and drier in early summer and forage was reduced, the cattle moved from uplands into the wetlands. Cattle occurrence on the silver sagebrush area increased by 22 August, but then, unlike that in low sagebrush areas, sharply declined in late September, when no cattle were recorded. Fall green-up and other factors attracted cattle to the silver sagebrush and low sagebrush areas adjacent to wetlands, but they then quickly left the silver sagebrush, possibly because this vegetation type was limited and forage scarce.

The delayed-grazing area contained less than 6 percent silver sagebrush, and no cattle were observed in this area.

### Pine-juniper-shrub

The pine-juniper-shrub area maintained a relatively stable standing crop of herbaceous plants throughout the grazing season and had a greater diversity of species than any of the other vegetation types. At the first sample period, bluegrass and fescue species comprised over 50 percent of the standing crop of grasses. Needlegrass was third in abundance, while ephemeral forbs made up only 13 percent of the herbaceous standing crop.

By the summer sample period squirreltail and wheatgrass species increased markedly, and annual cheatgrass declined. Bluegrass declined significantly by late summer and fescue doubled in availability. The P-J-S vegetation type offers a substantial amount of relatively good quality forage for an upland site during late summer.

The P-J-S habitat type was generally not preferred, except on the 22 June observation date, and then only in season-long grazing.

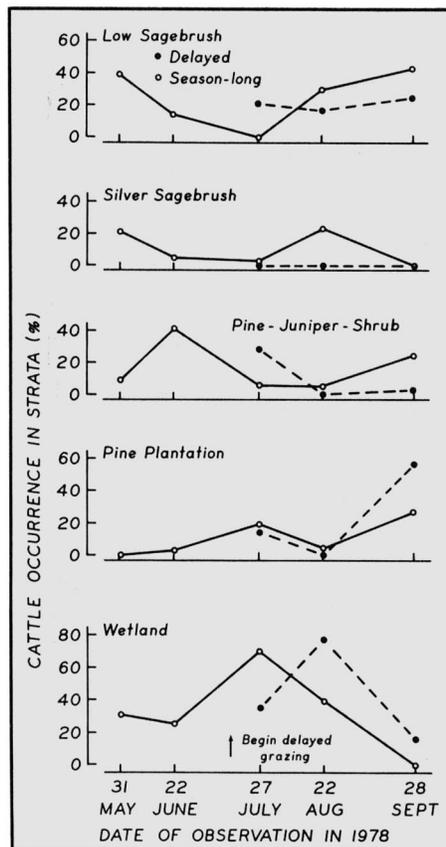


Fig. 1. Cattle occurrence in four vegetation types during delayed as compared with full-length grazing seasons.

Cattle occurrence increased toward the end of the grazing season as the animals drifted out of the wetlands, but the preference index was still negative.

### Pine plantation and wetlands

The standing crop of herbaceous plants in the pine plantations was greater in late spring than in late summer, largely because cheatgrass and forbs declined significantly after the first sample period. Needlegrass maintained the highest protein level of any of the grasses present, and it showed a 41 percent increase in standing crop by late summer.

Cattle use was greatest on 27 July and 28 September, and preference for the pine plantation area was shown on each of these dates in both the season-long and delayed-grazing pastures. Springtime use in the season-long pasture was minimal, because the other available vegetation types offered easier access and adequate forage at that time. High temperatures may have caused the increased use in July, when cattle could take advantage of the shade provided by the pine trees. The percentage of cattle observed in the pine plantation type was highest in late September, when this type offered relatively high-quality forage.

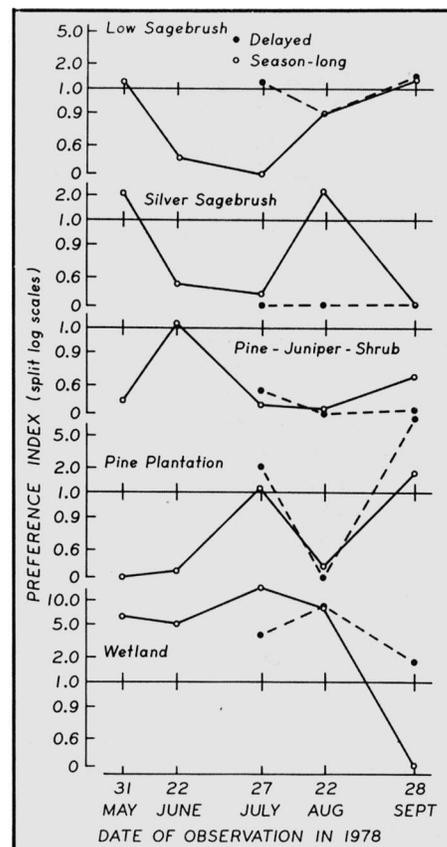


Fig. 2. Cattle preference for four vegetation types during delayed as compared with full-length grazing seasons.

Standing water made sampling the wetlands impossible in late spring. Wetlands produced tremendous quantities of herbaceous plants when compared with surrounding uplands; common spike-rush accounted for more than 81 percent of the production. The only significant decline in available forage during the grazing season was in forb standing crop from summer to late summer (115 to 12 kilograms per hectare).

Wetlands were heavily used during most of the grazing season, and cattle grazed season-long showed preference for them at all sampling dates except 28 September. About 25 to 30 percent of the cattle were observed in the wetlands on the first two sampling dates. By the summer, use of the wetland areas under season-long grazing skyrocketed to 70 percent.

Use of the wetlands in the season-long pasture declined for the remainder of the grazing season. Common spike-rush was deteriorating and becoming brittle, so that it lodged spontaneously as well as from trampling and grazing.

Seasonal cattle occurrences in the delayed-grazing wetlands were similar to those in the season-long area but lagged by about a month. Use on the delayed pasture was less



Left: Cattle in wetlands, one of the two major grazing areas. In background is pine-juniper-shrub vegetation.

Below: Upland grazing areas included low sagebrush range (foreground) and pine-juniper-shrub vegetation types.

heavy on 27 July, two weeks after the cattle entered the pasture. The reason may have been preferential foraging among the other vegetation types, which had not yet been grazed during the season. The later date for the peak and the sharp decline in use could have resulted from the early-season rest on this allotment. However, the large difference is removed when the preference index is used. The last observation on the delayed pasture showed a decrease in cattle occurrences and preferences, although 16 percent of the cattle were still in the wetlands on the last sampling date in the delayed area. Cattle under delayed grazing still showed preference for the wetlands, indicating that higher occurrence was not due to availability.

### Summary and discussion

Definite trends in habitat use were apparent on both the season-long and the delayed pastures. In the season-long area, cattle showed a higher preference for the upland vegetation early and late in the season. Wetlands were preferred throughout the grazing period until late September, when use dropped significantly and the cattle were almost exclusively on the uplands.

Trends in the delayed-grazing area were similar to those in the season-long pasture. In mid-July, when cattle entered the pasture, they showed a preference for several vegetation types. By 22 August they were primarily in the wetlands. The peak in wetland use came a month later in the delayed pasture than in the season-long pasture. By late summer the cattle were back on the uplands. In late September, cattle on the delayed pasture still showed some preference for the wetlands, unlike those in the season-long area.



Duck nesting in the study area is generally restricted to the low sagebrush and other upland vegetation types. Because of increased late-season grazing in the wetlands, more residual vegetation remained in this upland type where cattle were turned into pasture in mid-July (209 kilograms per hectare) than where they were grazed season-long (185 kilograms per hectare). Stocking rates were maintained so that comparable animal-unit-months were obtained on both pastures during the grazing periods.

The seasonal shifts in vegetation preferences of cattle may allow managers to design grazing plans to reduce upland grazing pressure while allowing considerable livestock

use. Delayed grazing would increase the amounts of residual vegetation important to nesting waterfowl. Care should be taken when extrapolating these data to other areas, however, and any grazing plan implemented should be carefully monitored.

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