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## **Grazing practices and rangeland conservation : towards output-based contracts to improve relevance and enhance technical innovation**

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**Key words :** grazing management, output-based contracts, rangelands, environment, performance

**Introduction** Conservation of natural vegetation in grazing systems has traditionally been achieved by restrictive contracts or permits. A typical grazing permit specifies the number of animals to be grazed, in and out dates, and infrastructure, but does not specify resource goals. Grazers are evaluated relative to their adherence to permit conditions, not resource objectives. These contracts are often stable for long periods and do not account for seasonal and annual variation in plant production, composition, and resulting changes in the suitability of landscapes for domestic and wild animals. While little effort is spent on monitoring grazing impact, there is even less effort devoted to evaluate the appropriateness of specific practices (input) with respect to resource goals (output). From a scientific standpoint, a review of the ecological literature shows many studies that evaluate the impacts of grazing compared with no grazing, but very few studies that evaluate the impacts of timing, duration, utilization rate, class of animal. In stark contrast to contracts or permit administration and ecological research, progressive practitioners know that successfully achieving resource objectives requires managing the dynamic interaction between flock behavior, individual animal performance, and the natural history of the existing and desired plant community. With this in mind, the concept of targeted grazing, as defined by Launchbaugh (2006) as the application of a specific kind of livestock at a determined season, duration and intensity to accomplish defined vegetation or landscape goals, has received much attention. Implementing these concepts requires important changes in administrative frameworks, technical management of the flocks, as well as monitoring and control procedures. The work reported in this paper explores implementing grazing contracts that explicitly specify the expected landscape results, rather than focusing solely on implementing practices (Léger *et al.*, 1999).

**Materials and methods** We report results from two different locations and administrative contexts: Hardware Ranch Wildlife Management Area, Utah, USA, and contracts from Common Agriculture Policy (CAP) in the Bauges Massif, Alpine Range, France. Creating resource-based contracts required defining and then transforming resource or conservation goals into intermediate objectives with specific practices to be favored or excluded, defining metrics for monitoring, and identifying alternative practices in case of failure.

**Results and discussion** Output-based contracts created contractor accountability for the resource goal, and encouraged stewardship and innovation within, rather than between, contracting periods (usually 3 to 5 years). They challenged administrators to work through the ecological complexity to concisely craft flexible, easily applicable goals that are constructed along reasonable time frames. Feasibility, specific challenges and solutions regarding contract complexity, administrative oversight, and the changing role of the flock manager are illustrated utilizing both French and US perspectives.

**Conclusions** Output-based contracts increase relevant interaction between researchers, extensionists and land management agencies, opening the way for a flexible management of grazing on rangeland (Wittig *et al.* 2004). Empowered ground level management supported by an output-based contract is critical to the ultimate success of land management in a changing world.

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