REGULATED DEFICIT IRRIGATION of ALFALFA

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Executive Summary

Alfalfa is a major crop grown in California, using between 4 million to 5.5 million acre-feet of water per year. Thus, interest exists in reducing this water use through regulated deficit irrigation. Regulated deficit irrigation involves terminating irrigations during July and August. During this time period, alfalfa yield normally are low, and thus deficit irrigation might be implemented with a minimal impact on seasonal yield. Questions exist concerning the impact of this strategy on future growth. Past experiments using regulated deficit irrigation have shown mixed results on subsequent alfalfa growth. Also, the Department of Water Resources is interested in this approach as a means of obtaining additional water for transfer elsewhere. The amount available for transfer will be the difference between the evapotranspiration of fully irrigated alfalfa and the evapotranspiration under deficit irrigation.

The objective of this project is to investigate the effect of regulated deficit irrigation on alfalfa yield, quality, and evapotranspiration using farm-level demonstrations and plots at UC Davis. Two fields have been selected on farms to evaluate this strategy at the farm levels. At one field, the evapotranspiration of alfalfa will be determined using the Bowen Ratio Energy Balance method and measurements of canopy coverage. At the UC Davis site, small plots will be used to investigate a range of deficit irrigation strategies and the effect of deficit irrigation on alfalfa varieties.

This proposal is part of a multi-location, multi-agency effort to improve water use efficiency and irrigation methodology for alfalfa. This proposed work would document the potential water savings using early-season irrigation cut-off and water monitoring. The effect of these irrigation cut-off treatments on yield and stand persistence will be evaluated.

This project will complement a similar project being conducted in the Tulelake Basin of the Klamath River.