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Towards Greater Certainty in Upper Klamath Basin Water Management

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TOWARDS GREATER CERTAINTY IN UPPER KLAMATH BASIN WATER MANAGEMENT

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In 2001, an extreme drought tightened water supply in the Upper Klamath Basin (basin) while earlier 2001 increases in Endangered Species Act (ESA) water requirements for basin fish species elevated demands. The Bureau of Reclamation (Reclamation), which manages irrigation water in parts of the basin located near the Oregon-California border, responded by severely curtailing water allocations to Reclamation Project (project) irrigators for the 2001 growing season. Consequently, project irrigators lost approximately $35 million in farm income, demonstrating that ESA requirements have significantly changed how water must be managed in the basin. These circumstances prompted Reclamation to establish a federally-funded water bank to provide greater supply certainty in the basin. Yet this certainty is undermined by several significant factors which influence the cost effectiveness and geographic impacts of future bank operations. These include unspecified higher ESA water requirements due to a recent ninth circuit court ruling, greatly increased energy rates to irrigators due to a mid-2006 contract termination with the regional energy provider, uncertain water returns from land idling due to a shortage of data on subirrigation, and unknown annual availabilities of groundwater. Furthermore, although the bank has provided a water supply cushion, greater certainty at a lower cost would result from increased geographic and institutional flexibility in water bank operations. This paper evaluates the potential impacts of the above uncertainties on water bank cost-effectiveness and land idling distribution. Additionally, given the infrastructural and institutional limitations on water transfers in the basin, the cost effectiveness of different levels of water trading flexibility will be compared to assess both realistic and potential banking arrangements. The above objectives are addressed using a mathematical optimization model and a Geographic Information System (GIS) of hydrologic, agronomic and economic data. The model reflects farmer behavior by minimizing farm losses in the context of institutional and physical constraints. Irrigated areas in the basin are spatially arranged in a GIS divided into 15 county-defined units, each with different soil classes, crop rotations, irrigation technologies (impacting energy requirements), and land values. Results are anticipated to provide greater certainty over the spatial and economic impacts of energy price increases and possible changes in ESA requirements. Furthermore, they are anticipated to clarify the significance of subirrigation and groundwater to water management decisions in the basin. The water bank analysis is expected to confirm well documented evidence that increased flexibility induces greater cost effectiveness, but the spatial impacts of these adjustments are uncertain. In the Klamath, cost effectiveness of flexibility may imply that an irrigation infrastructure should be established capable of monitoring and measuring individual transfers.

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