
AWRA 2007 ANNUAL CONFERENCE
Albuquerque, NM

November 12-15, 2007

Copyright © 2007 AWRA

**USING CONSERVATION CREDIT OFFSET TRADING AND GROUNDWATER PERMITTING IN A
GROUNDWATER SCARCE WATERSHED TO PROTECT IN-STREAM ECOLOGICAL SERVICE VALUES**

Sandra Batie,* Michael D. Kaplowitz, Saichon Seedang

ABSTRACT: Growing demand for groundwater withdrawal for urban, agricultural, and industrial development can lead to depleted groundwater. Withdrawals at rates greater than recharge can draw down water levels in nearby wells, reduce stream base flows, and adversely impact aquatic ecosystems dependant on groundwater flows (e.g., wetlands, rivers). The increased use of high capacity wells has created conflicts among water user groups and raised concerns about aquatic ecosystem protection in the Great Lakes region. Policymakers, stakeholders and others are calling for innovative approaches to sustain groundwater resources that balance the need for economic development with environmental and ecological protection. This research explores a groundwater management approach based on market-like structures-groundwater withdrawal permits and a system of marketable conservation credits. Using groundwater and other data from a watershed in southeastern Michigan, the researchers developed and evaluated the strengths and weaknesses of such a system. It was found that the proposed market-like structure (conservation credit offset trading) has many advantages when compared with other more traditional control mechanisms (e.g., restrictive regulations or prohibition). The proposed scheme appears to allow for new or expanded high value water users even in critical watershed areas especially when such users appropriately compensate existing groundwater users to reduce their withdrawals, change behavior, and make offsets available. The research outlines the policy characteristics for a conservation credit offset program intended for use with a groundwater permitting regime. The study specifies the necessary conditions for a conservation credit program to operate and provides examples of potential offsets (i.e., conservation credits) that may compensate for proposed groundwater withdrawals. The researchers developed a hypothetical permit system, a regime for conservation credit offsets, and tested alternative scenarios for a critical watershed using groundwater, land use, and hydrological modeling. The research demonstrates the importance of modeling for evaluating impacts of alternative pumping and policy scenarios as well as understanding the effectiveness of various conservation credit offsets on groundwater levels, stream base flows, surface water levels, and ecological impacts. The research demonstrates that a conservation credit trading approach and permit system may provide a cost-effective method for balancing groundwater use and ecological protection.

*Professor, Department of Agricultural Economics, Michigan State University, 204 Agriculture Hall, East Lansing, MI 48824 USA, Phone: 517-355-4705, Fax: 517-432-1800, Email: batie@msu.edu