



USDA-CSREES 2006 National Water Quality Conference

Conservation adoption history and water quality in two CEAP watersheds, Jasper County, Iowa

Historical land use and conservation practices were compiled for the Walnut and Squaw Creek watersheds (5218 and 4703 ha) located in south-central Iowa. The conservation history of the two watersheds was assessed by digitizing the length of terraces and grass waterway and the area of contour cropping from historical aerial photographs taken in 1940, 1950, 1967 and 1990. Results indicate essentially no conservation implemented in 1940 and slow adoption of practices by 1950. The greatest adoption of conservation practices occurred from 1950 to 1967 with additional increases noted by 1990. By 2005 conservation practices were well-established on row crop lands in both watersheds. Mulch till and no till are found on 93-94% of row crop lands, and 44-54% of row crop lands have some combination of buffers, terraces or contours on them.

As part of the Walnut Creek Monitoring Project, land use from 1990 to 2005 was tracked using a combination of aerial photographs and field mapping. In 1990, land use in both Walnut and Squaw Creek watersheds was dominated by row crops (70%). By 2005 in Walnut Creek watershed, 1221 ha of land were planted in native prairie at the Neal Smith National Wildlife Refuge, representing 23.5 percent of the watershed. In three monitored subbasins of Walnut Creek, restored prairie accounted for 14.3 to 45.9 percent of the land area. In contrast, row crop land use increased 9.2 % in Squaw Creek with conversion of CRP to row crop occurring in the late 1990's. In two subbasins, row crop percentage increased by 26 and 29 percent from 1990 to 2005.

Despite widespread conservation adoption, large-scale land use changes from 1990 to 2005 profoundly affected stream nitrate concentrations. In Walnut Creek, prairie restoration resulted in a 20% decrease in stream nitrate concentrations relative to Squaw Creek and a 22 to 49% decrease in stream nitrate in three subbasins. In Squaw Creek, nitrate concentrations increased 17% in the watershed and from 133 to 1163% in two subbasins with largest row crop increase. Thus, converting row crop lands to grass reduces stream nitrate levels over time, but stream nitrate may quickly increase if grasslands are converted back to row crop.

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