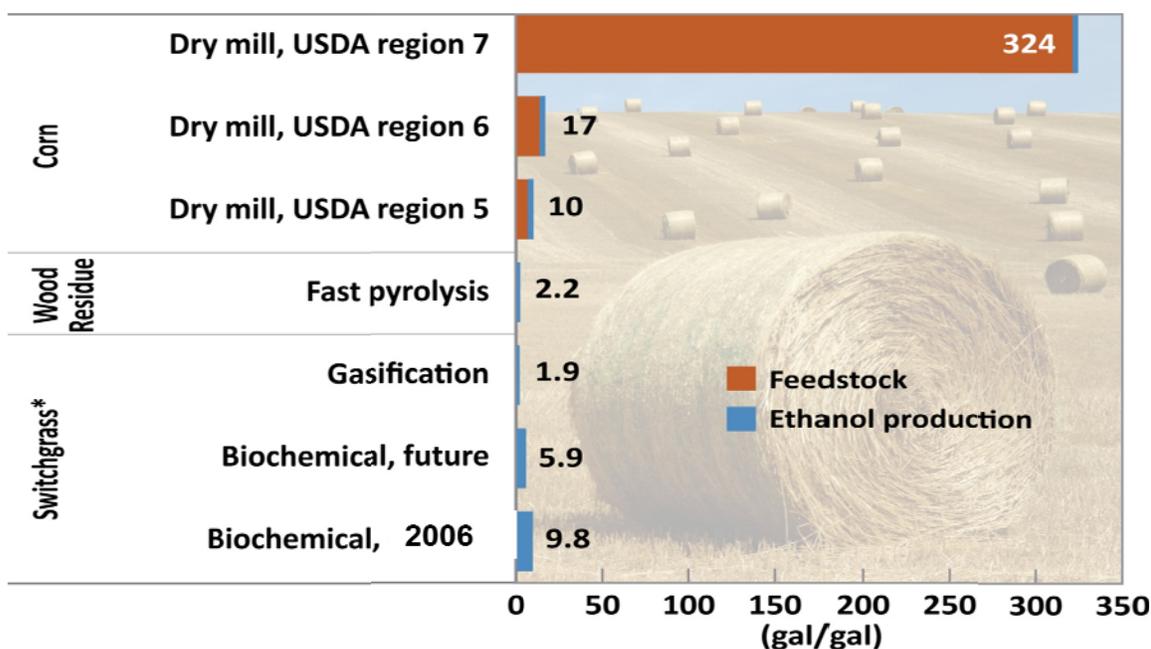
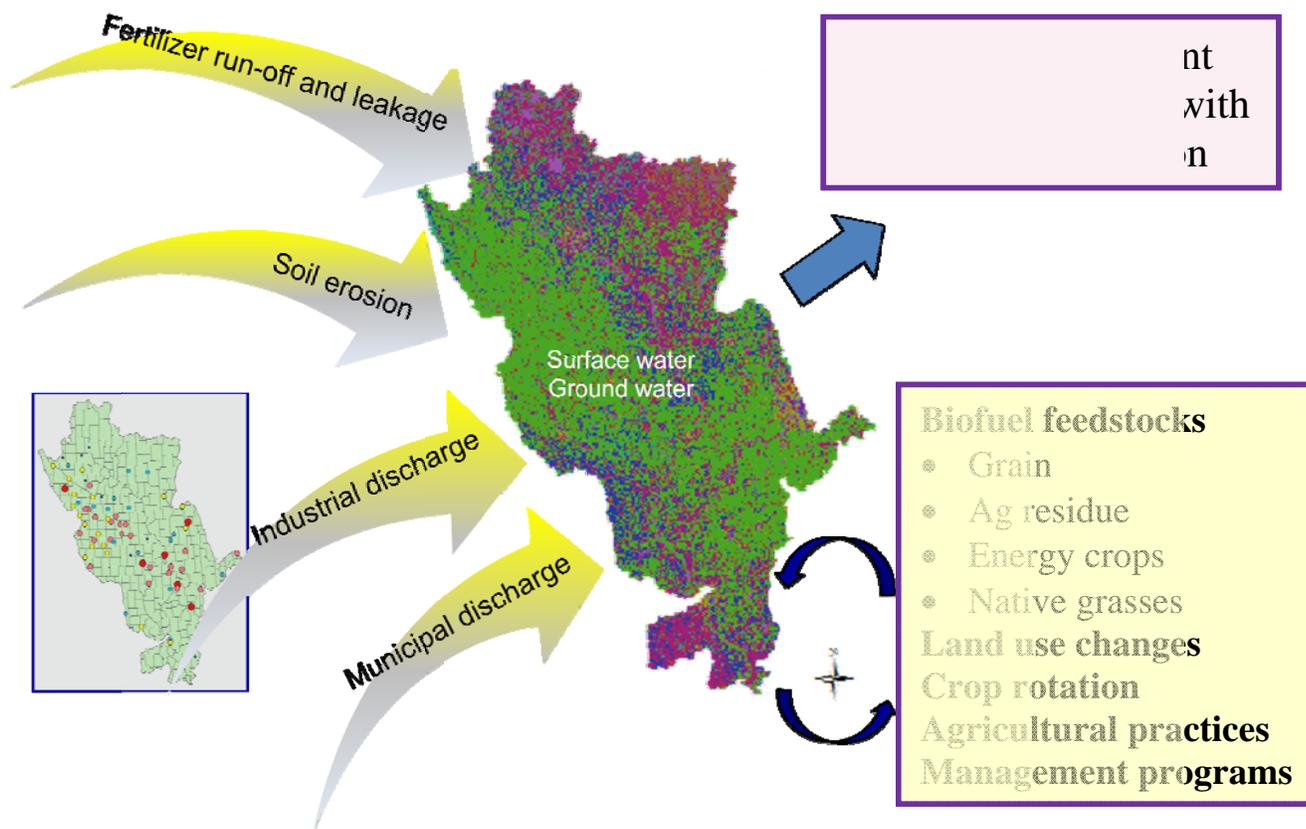


GREET Water Analysis

One of the key environmental sustainability issues for biofuel production is water. Argonne has been addressing water quantity and quality issues associated with large-scale biofuel production. Argonne analyzed irrigation and process water consumption factors in major life cycle stages for ethanol produced from corn through dry milling, ethanol from switchgrass via biochemical and thermochemical processes, and green diesel and green gasoline from forest wood residue. A comparative study has been conducted to further compare with baseline fuels such as petroleum gasoline production from conventional sources and oil sand. In addition, water consumption factors in the production stage of electricity generation from various renewable sources and non-renewable sources were estimated. The key findings from that study provided a base for resource planning in biofuel development and were cited in two GAO reports in 2009.



Another strong capability at Argonne for water analysis is watershed modeling. Current work examines the regional impact of large-scale bio-feedstock and biofuel production on water quality in major feedstock production areas in the United States. A quantitative estimate of spatially distributed nutrient burdens is obtained through extensive watershed modeling using SWAT that incorporates historical climate, soil, surface stream flow, geography, cropping, ground cover, agricultural practice, and point sources discharge information for the selected river basin. A rigorous model calibration and validation process is established to generate a model baseline. Scenarios are developed to assess the potential environmental implications of biofuel production through conventional starch-based feedstocks, agricultural residues, and perennial cellulosic feedstocks at projected high yield to achieve the production level mandated by the EISA 2007. Such an approach could be used to identify specific regional factors affecting water quality, examine options to meet the requirement for environmental sustainability, mitigate undesirable environmental consequences, and address issues associated with site selection for biorefineries.



POC May Wu - mwu@anl.gov, 630-252-6658