A Proposal for Studying Wetlands in The Face of Shifting Agricultural Practices, Energy Development, and Hydrologic Patterns

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Management of migratory birds in WesternNorth America, especially those dependent on wetlands, are facing growing pressure on their habitat from increased biofuels production, oil and gas development, climate change, and especially potential shifts out of Conservation Reserve Program (CRP) grasslands. All these are affecting the hydrology of Montana wetlands, especially in the prairie pothole landscapes of the Northern and Eastern part of the state. An integrated understanding of the geohydrology and ecology of such wetlands is needed to understand, predict, and manage linkages between geohydrology and aquatic ecosystems and the response of wetland habitat to climatic and management actions. In Sheridan County, alone, there are over 1000 active and abandoned oil wells, and exploration

and production wastes from many of these wells have resulted in reduced water quality in adjacent wetlands. These issues are exceedingly complex, and we have proposed an ambitious project of interdisciplinary research to begin to understand the complexities. This project examines the following questions posed by Eastern Montana and Western North Dakota natural resource managers: 1) Are the brine plumes from oil wells in the Medicine Lake watershed affecting wetlands at Medicine Lake National Wildlife Refuge and the Northeast Montana Wetland Management District? And, are environmental effects from wells drilled in the past (using lined reserve pits) different than effects from the older, abandoned wells (that used unlined reserve pits)? 2) How will conversion of CRP lands back into crop and biofuels production affect groundwater gradients in refuge and Wetland Management District wetlands? 3) What effect will changes in hydrology due to CRP conversion have on brine plume movement? and 4) How representative are the environmental characteristics and issues of the Medicine Lake watershed compared with those at the broader regional scale? To what extent can a broader geographic context help inform management at the local scale?