



## WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: Influences of fathead minnows on nutrient partitioning, water clarity, and ecosystem structure in prairie wetlands

Duration: 1 September 1996 - 31 August 1998

Federal funds requested: \$58,214 \$58,214 0

Total Direct Indirect

Non-Federal funds: \$193,721 \$120,463 \$73,258

Total Direct Indirect

Principal investigators:

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Congressional District: North Dakota First

Critical regional water problem:

Prairie wetlands are an important component of the natural landscape in the Prairie Pothole Region (PPR), where they play a key role in regional hydrology and landscape ecology. These wetlands provide crucial habitat for distinctive communities of native vertebrates, aquatic invertebrates and hydrophytes. Wetlands have been nearly eliminated in many areas throughout the PPR, and remaining wetlands often function as islands of aquatic habitat for native species. Fathead minnows (*Pimephales promelas*) are common in semipermanent wetlands throughout the PPR of the United States and Canada (Peterka 1989) and exert major influences on biotic and abiotic characteristics of these aquatic habitats. Fathead minnows are often introduced to prairie wetlands for subsequent commercial harvest and sale as bait fish. Densities of native wetland fishes are highly dynamic from year to year as winterkill often reduces or eliminates these natural populations. In contrast, repeated introduction of minnows or other fishes will ameliorate effects of winterkill and favor development of persistent, high density fish populations. The ecological impacts of such abnormal fish densities on wetland ecosystems are often very evident, and include algae blooms, high turbidity, loss of wetland plants, invertebrates, and other vertebrate species, resulting in generally lower habitat quality for many wetland-dependant species. Priorities for federal, state, and local agencies charged with managing the region's wetlands include maintenance of the biological diversity and

functional integrity of these ecosystems within the regional landscape. In addition to economically-important issues of water quality, flood protection, and optimization of waterfowl production, wetland managers are under increasing pressure to permit exploitation of these basins for fish culture and harvest. The purpose of this research is to provide a clearer picture of the impacts high minnow densities have on the ecological structure of prairie pothole wetlands, particularly with respect to nutrient dynamics, water clarity, and overall quality of the aquatic habitat.

#### Results and benefits:

The findings from this research will provide a scientific basis supporting decisions regarding management of prairie wetland basins. Policy issues, such as whether to permit stocking and harvest of fish, or how best to manage water levels in ways that encourage or inhibit fish in wetlands, will be better understood.