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Management of Natural Lakes in the Northern Great Plains

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ABSTRACT

Approximately 2,800 natural lakes smaller than 10 acres in size are found in the northern plains region of Nebraska, South Dakota and North Dakota. Water quality characteristics vary greatly among lakes in close geographical proximity. They range from fresh to highly mineralized bicarbonate-carbonate-hydroxide (alkaline) to chloro-sulfate (saline) types and regionally represent the largest concentration of inland mineral waters in North America. Water quality together with shallow basin morphometry exert major environmental influences on the fisheries in great plains natural lakes.

In the sandhills region of Nebraska (20,000 sq. mi.) only about 45% of the estimated 1,400 natural lakes support fish populations because of the excessive alkalinity content of many lakes. Manageable lakes for sport fishery have a total alkalinity content of $< 1,000$ mg/l with a maximum depth > 5.0 ft. Northern pike, Esox lucius, largemouth bass, Micropterus salmoides, bluegill, Lepomis macrochirus, yellow perch, Perca flavescens, black crappie, Pomoxis nigromaculatus, and black bullhead, Ictalurus melas, are the major game fish. "Alkalionic" species, Sacramento perch, Archoplites interruptus, and the fathead minnow, Pimephales promelas, survive in lakes of moderate alkalinities (900-1,800 mg/l). Annual recruitment of above species is normally adequate and hatchery stock is utilized only under renovated and winter-kill conditions.

The natural lakes of South Dakota are predominately fresh with scattered saline waters found in glacial drift areas rich in soluble sulfates and chlorides. The larger and deeper lakes lie in the northeastern region of the state. These natural lakes are considerably deeper (up to 69 ft.) than the Nebraska lakes. The sport fishery is being managed for similar species composition. In addition, the walleye, Stizostedion vitreum v., is an important sport fish in several large South Dakota lakes. Thermal stratification develops in the deeper lakes of the Dakotas whereas the Nebraska lakes remain nearly homothermous.

North Dakota lakes of varying mineral content are for the most part concentrated in the glaciated drift region of the central area of the state. The northwestern sector also contains several hundred sizeable lakes. The majority of the natural lakes are $\angle 20$ ft. in depth and are of the chloro-sulfate mineral water type. Salinity and loss of dissolved oxygen during the winter months are the two principal environmental characteristics that preclude the establishment of fish populations in about 60% of the lakes. The northern pike is the major game fish and is intensively managed in suitable natural lakes. Recently, North Dakota has experienced success with trout introductions in several lakes.

The thousands of fresh and mineral waters throughout the Dakotas and Nebraska offer vast opportunities for experimentation in hydrobiology and fisheries management.

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