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DISTRIBUTION AND ECOLOGY OF MUSSELS IN THE RED RIVER VALLEY, GRAND FORKS TO DRAYTON[1]

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ABSTRACT

During the summer of 1965, 49 stations were sampled on the Red River and its seven tributaries between Grand Forks and Drayton: the Turtle, Forest and Park rivers in North Dakota, and the Red Lake, Snake, Middle and Tamarac rivers in Minnesota. In addition to collecting mussels and other mollusks, data were gathered on the following: pH, dissolved oxygen, free carbon dioxide, nitrate, nitrite, carbonate and total alkalinity, calcium and total hardness, chloride and iron content, water velocity, water temperature, bottom sediment, aquatic vegetation, and physical characteristics of the river.

Thirteen species of mussels, most from the Red and Red Lake rivers, were collected: *Fusconaia flava* (Rafinesque), *Amblema costata* Rafinesque, *Quadrula quadrula* Rafinesque, *Lasmigona compressa* (Lea), *L. costata* Rafinesque (not collected alive), *L. complanata* (Barnes), *Anodonta grandis* Say, *Anodontoides ferussacianus* (Lea), *Strophitus rugosus* (Swainson) (not collected alive), *Proptera alata* (Say), *Ligumia recta latissima* (Rafinesque), *Lampsilis siliquoidea* (Barnes), and *L. ventricosa* (Barnes). Two species, *Quadrula quadrula* and *Anodontoides ferussacianus,* are apparently new for the Red Lake River and one species, *Lasmigona compressa,* is new for the Forest River. More species of mussels occur in the Red River than in any of its tributaries, with the exception of the Red Lake River. Live species in the tributaries range from one in the Park River (*Anodontoides ferussacianus*) to five in the Forest River (*Lasmigona compressa, L. complanata, Anodonta grandis, Anodontoides ferussacianus,* and *Lampsilis siliquoidea*). Other tributaries have two to four of the species found in the Forest River. The Park River in North Dakota and the Tamarac, Middle, and Snake rivers in Minnesota are particularly poor in mussels.

About 530 chemical analyses were made in the field at 46 of the 49 stations, including 15 stations on the Red River and three to five stations on each of the tributaries. The North Dakota tributaries all show an increase in chloride content downstream, and high values (up to 2200 ppm) correlate with a downstream decrease or absence of mussels in two of the tributaries. Other factors, in addition to

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chloride content, seem to limit the distribution of mussels in the third tributary. The Minnesota tributaries generally have low chloride values, and the Red River has relatively low and nearly constant values of chloride content.

The absence or decrease of mussels in parts of the studied area may be attributed to at least three possible causes: high chloride content, pollution, and long periods of no flow. High chloride values affect mussels in the lower reaches of the Turtle and Forest rivers. The apparent lack of mussels at two stations in Grand Forks is attributed to industrial or human sewage. The scarcity or lack of mussels in the lower reaches of the Tamarac, Middle, and Snake rivers may be the result of occasional long periods of no flow.