

ANODONTA SPECIES OF LAKE McCONAUGHY, WESTERN NEBRASKA

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ABSTRACT

This is the first report of bivalves from Lake McConaughy, the largest reservoir in Nebraska. Two, or possibly three, species of the genus Anodonta (Bivalvia, Unionidae) were found live from fourteen sites, over an area of 1,400 square meters, in depths ranging from three to five meters of water.

Lake McConaughy is formed by Kingsley Dam, completed in 1941, across the North Platte River in southwestern Nebraska. The reservoir is located in Keith County, thirteen km north of Ogallala, Nebraska, and thirty-six km northwest of the Colorado-Nebraska state line, at approximately 101° north longitude, and 41.5° west latitude. The lake is thirty-five km long, six and a half km wide for some distance above the dam, and is forty-six m deep near the dam (Fig. 1). It has a shoreline of 170 km and a surface area, when full, of 14,165 ha. Since the dam was put into operation in 1941, Lake McConaughy's greatest storage was in July of 1951, at $23.6 \times 10^8 \text{ m}^3$ and its lowest in October of 1956 at $4.72 \times 10^8 \text{ m}^3$ (CNPPD, 1965b).

Lake McConaughy, Nebraska's largest reservoir, is the backbone of Central Nebraska Public Power and Irrigation District, the state's largest irrigation project. The primary purpose of this reservoir is to supplement the irrigation needs of the agricultural community below the dam; consequently water levels fluctuate dramatically throughout the year, with significant effects on the fauna of the lake.

Comparative ecological studies on temperature, oxygen concentration, water chemistry, and fluctuating water levels as factors influencing the fish population of Lake McConaughy have been the focus of continuing studies by the state's fishery department (Taylor, 1979). Little work, if any, has been conducted in identifica-

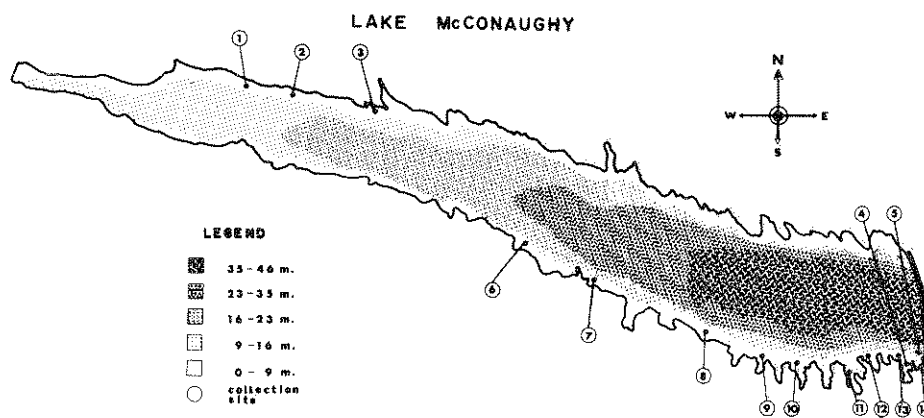


FIG. 1. Map of Lake McConaughy showing water depth and distribution of collection sites, each representing a one-hundred square meter underwater quadrat.

the North Platte River (part of the Missouri River drainage) and has been repeatedly stocked with game fish from sources both in the United States and Canada by the Nebraska Game and Parks commission (Nebraska Game, Forestation, and Parks Commission, 1958-79). Since *Anodonta* spp. are known from the eastern part of the Missouri drainage and Wyoming, but may also be carried as parasitic larvae by stocked fish (Pennak, 1958), it is impossible to determine the source of the clams. Other lakes do not occur naturally along the Platte, and the North Platte River formerly went dry in late summer. Therefore, it seems likely that *Anodonta* abundance has greatly increased since the completion of Lake McConaughy. The presence of *Anodonta* in the Sandhills Lakes northwest of Lake McConaughy seems unlikely because of their unusual chemistry (McCarragher, 1977), and lack of outlets. I do predict their presence in comparable reservoirs in the region (e.g. in Kansas and Colorado).

The specimens ranged in length from 8 to 21 cm, with a live weight averaging 450 g. The distribution was skewed to large clams; none under 8 cm were found. While this could indicate the absence of small individuals from Lake McConaughy, I believe it is due to the difficulty of locating small clams in the poor visibility of the bottom (usually under 3 m). The substrate of Lake McConaughy is sand, but a thin layer of silt is found in the deeper waters toward the dam. 12 of the clams were found on the sand-silt; only 4 clams (*A. g. grandis* and *A. imbecillis*) were collected on sand-rock substrates (Table 1).

Of the larger clams collected (MDB4, JEF6, MDB8, JEF9) the majority were found in deeper waters located in the coves at the base of the dam (Fig. 1). This area should be the most stable in terms of water level fluctuations due to the fact that it is closer to the dam and should therefore maintain a higher, more constant level of water.

No *Anodonta* individuals were found in depths less than 2 m, despite searching at least 400 m². This result is confirmed by area divers, who re-

ported seeing 70 additional clams, all in depths of 3 to 5 m. Therefore, *Anodonta* appears to be confined to the perimeter waters (3-5 m deep) of this reservoir. Since the study was conducted in August of the year in which the lake was high until quite late in the season, it is likely that these depths represent early summer levels, and that minimum depths of perhaps slightly under 2 m are experienced at those sites only at lowest storage. This suggests that *Anodonta* is uncommon in the shallow (rarely 2 m deep for any extended period of time) North Platte River.

No other mollusks were observed; presumably they are rare or absent.

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LITERATURE CITED

- Burch, J. B. 1973. Biota of Freshwater Ecosystems, Identification Manual #11 Freshwater Unionacean Clams (Mollusca: Pelecypoda) of North America. *U.S. Environmental Protection Agency Publication*, Washington, D.C.
- Central Nebraska Public Power. 1965a. Central Nebraska District, Lake McConaughy. *Central Public Power District Publication*, North Platte, Ne.
- Central Nebraska Public Power. 1965b. Statistics of the Lake McConaughy Reservoir. *Central Public Power District Publication*, North Platte, Ne.
- Frierson, L. S. 1910. Description of a new species of *Anodonta*. *The Nautilus* 23(9):113-114.
- McCarragher, D. B. 1977. Nebraska's sandhills lakes. Nebraska Game and Parks Commission, Lincoln, Ne.
- Nebraska Game, Forestation, and Parks Commission. *Fish Stock Records*. 1958-1979. North Platte Regional Office, North Platte, Nebraska.
- Pennak, W. 1958. *Study of Freshwater Invertebrates*. University of Colorado Press, Denver.
- Taylor, M. W. 1979. Modelling the influence of eutrophication on the cold-water fishery habitat of Lake McConaughy, a "two-story" reservoir. *Nebraska Game and Parks Commission Publication*, Lincoln, Ne.