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ABIOTIC FACTORS AFFECTING SUMMER DISTRIBUTION AND MOVEMENT OF MALE PADDLEFISH, *POLYODON SPATHULA*, IN A PRAIRIE RESERVOIR

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ABSTRACT—Six male paddlefish, *Polyodon spathula*, were implanted with ultrasonic temperature-sensing transmitters and tracked during June through August 1997 to quantify effects of physicochemical conditions on their distribution and movement in Keystone Reservoir, Oklahoma. Paddlefish moved about twice as much during night than day. Movement rate of paddlefish was related to reservoir water level, inflow, and discharge from the reservoir at night; however, none of these variables was significant during the day. Location in the reservoir (distance from the dam) was negatively related to water level and positively related to inflow during day and night periods. Location in the reservoir was negatively related to discharge during the day. Paddlefish avoided the highest available water temperatures, but did not always avoid low dissolved oxygen concentrations. Paddlefish avoided the Cimarron River arm of the reservoir in summer, possibly because of high salinity. Our study demonstrates that distribution of paddlefish during summer and movement in Keystone Reservoir was influenced by physicochemical and hydrologic conditions in the system. However, biotic factors (e.g., food availability) not measured in this study may have been influenced by abiotic conditions in the reservoir.

RESUMEN—Se implantaron transmisores ultrasónicos sensores de temperatura a seis machos de *Polydon spathula* y se les siguió de junio a agosto de 1997 para cuantificar los efectos de las condiciones fisicoquímicas en su distribución y movilidad en Keystone Reservoir, Oklahoma. *Polydon spathula* se trasladó dos veces más durante la noche que durante el día. La tasa de movimiento de *P. spathula* estuvo relacionada con el nivel del agua de la reserva, entrada de agua, y descarga de la reserva durante la noche; sin embargo, ninguna de estas variables fue significativa durante el día. La localización en la reserva del *P. spathula* (distancia de la presa) estuvo relacionada negativamente al nivel del agua y positivamente relacionada a la entrada de agua durante los periodos del día y la noche. Su localización en la reserva estuvo negativamente relacionada a la descarga durante la noche. *Polydon spathula* evadió las más altas temperaturas del agua disponibles, pero no siempre evadió bajas concentraciones de oxígeno disuelto. *Polydon spathula* evadió la rama de la reserva del Cimarron River en el verano, posiblemente por la alta salinidad. Nuestro estudio demuestra que la distribución durante el verano de *P. spathula* y su movimiento en Keystone Reservoir estuvo influenciado por condiciones fisicoquímicas e hidrológicas en el sistema. Sin embargo, factores bióticos (e.g., disponibilidad de comida) no medidos en este estudio pudieron también haber sido influidos por las condiciones abióticas en la reserva.

The paddlefish, *Polyodon spathula*, is native to large free-flowing rivers of the central United States where they thrive in backwaters, oxbows, and deepwater channel habitats. In spring, paddlefish in large rivers make extensive spawning migrations (Russell, 1986), moving among pools during high water and associating with tailwater (when dams are present) and turbulent main-channel border habitats (Southall and Hubert, 1984; Moen et al., 1992). Over the past several decades substantial populations of paddlefish have developed in reservoirs of large rivers (Russell, 1986). Paddlefish presumably exhibit springtime movement and habitat use patterns in reservoir systems comparable to those in large river systems (Combs, 1982; Paukert, 1998); however, we know little about summer distribution