Harvest Management Regulation Options for Oklahoma's Grand Lake Stock of Pa

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sh. Implementation would result in substantial changes in the Oklahoma paddle sh recreational shery. Results for the Grand Lake stock will serve a a framework for statewide harvest management regulation.

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e North American paddle sh (Polyodon spathula) inhabits the Missouri and Mississippi River basins of the central United States from Montana to the Gulf of Mexico and east to New York (Gengerke 1986, Bettoli et al. 2009). Current populations of this highly migratory species are much reduced in many localities (Russell 1986) and have become fragmented as a result of altera tions in their large-river habitats from dam construction, chan nelization, and other human actions (Sparrowe 1986, Gerken and Paukert 2009). As dams have blocked migratory corridors and as o -channel habitats on many river reaches have disappeared or be come disconnected, paddle sh reproductive success has declined

mercial and recreational fishing regulations. Regulatory measures used vary by state and include bag limits, protected slots, minimum

provide age structure for the Grand Lake population and internal examination provides metrics for physiological and reproductive status. The PRC provides angler residency, angler statistics, and angler contacts which are valuable for harvest assessment. Simultaneously with the opening of the PRC in 2008, ODWC required a free, mandatory permit of all anglers who attempt to harvest paddlesh.

e exact cause of this strong cohort is not known, but was associated with high river discharges and reservoir levels (Scarnecchia et al. 2013). Regardless of the cause, the strong 1999 cohort has supported a robust shery since 2008. However, the combination of natural mortality and harvest has outpaced recruitment since 2008, resulting in a declining population. e rate of decline can not be explained solely by angler exploitation, but also by natural mortality, although non-harvest (hooking) mortality remains unquanti ed. What evidence is available suggests that the Grand Lake population probably also uctuated in abundance greatly in the past. Combs (1982) reported a 5.9% annual decline in catch rates from 1977 to 1981 and Combs and Finnell (1985) reported a 5.2% annual decline in catch rates from 1982 to 1984. Although these declines were substantial, they were not as severe as the declines observed in the Neosho River, Kansas, where catch rates declined by 20% annually from 1974 to 1978 (Pitts and Pitts 1979). Pitts and Pitts (1979) attributed the decline in the Neosho River to overharvest, but Combs (1982) suggested that the declines observed in Grand Lake were likely due to natural uctuations in recruitment.

but seeks to limit total aggregate harvest, and may reduce an individual's annual catch. Enactment and implementation of a TAC requires real-time monitoring of harvest and fishery closure when the threshold of TAC is reached or exceeded. These concepts are more simply and appropriately applied to a single harvest manage-