Energetic Carrying Capacity of Actively and Passively Managed Wetlands for Migrating Ducks in Ohio

MICHAEL G. BRASHER,1,2 School of Natural Resources, The Ohio State University, 210 Coffey Road, 210 Kottman Hall, Columbus, OH 43210, USA
JASON D. STECKEL,3 School of Natural Resources, The Ohio State University, 210 Coffey Road, 210 Kottman Hall, Columbus, OH 43210, USA
ROBERT J. GATES, School of Natural Resources, The Ohio State University, 210 Coffey Road, 210 Kottman Hall, Columbus, OH 43210, USA

ABSTRACT Habitat conservation strategies of the North American Waterfowl Management Plan (NAWMP) are guided by current understanding of factors that limit growth of waterfowl populations. The 1998 implementation plan of the Upper Mississippi River and Great Lakes Region Joint Venture (UMR and GLRJV) assumed that availability of foraging resources during autumn was the primary limiting factor for duck populations during the nonbreeding season. We used multistage sampling during autumn and spring 2001–2004 to estimate energetic carrying capacity (ECC) of actively and passively managed wetlands in Ohio, USA, and examine this assumption. Energetic capacity during autumn and spring was similar between actively and passively managed wetlands each year. Averaged across years, energetic carrying capacity was 3,446 and 2,017 duck energy-days (DED/ha) for actively and passively managed wetlands, respectively. These estimates exceeded the UMR and GLRJV assumption that 1,350 DED/ha were provided by managed wetland habitats. Energetic carrying capacity declined each year by >80% between autumn and spring migration. Consequently, ECC of actively and passively managed wetlands was low during spring (n=66–242 DED/ha). These results suggested that duck foraging resources in actively and passively managed wetlands are abundant during autumn, but overwinter densities may create food-limiting environments during spring. (JOURNAL OF WILDLIFE MANAGEMENT 71(8):2532-2541; 2007)

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Conservation and management of waterfowl populations in North America have been guided since 1986 by goals and objectives of the North American Waterfowl Management Plan (NAWMP). Success of the NAWMP is predicated on identifying factors limiting population growth, and mitigating their effect through landscape-scale habitat conservation and management (Williams et al. 1999). Diet quality and wetland habitat conditions may affect waterfowl body condition, survival, and subsequent recruitment (Heitmeyer and Fredrickson 1981, Delnicki and Reinecke 1986, Reinecke et al. 1987). Consequently, the Upper Mississippi River and Great Lakes Region Joint Venture (UMR and GLRJV) assumed that availability for foraging resources was the factor during migration and winter most likely to limit waterfowl populations. The UMR and GLRJV thus established habitat objectives for migratory and wintering waterfowl from bioenergetic models that estimate quantities of habitats necessary to satisfy seasonal energy demands of waterfowl (NAWMP Plan Committee 2004).

A hallmark of the NAMWP is its recognition that conservation objectives and strategies should be based on existing knowledge of waterfowl ecology and refined subsequently with contemporary science. The 1998 NAWMP update (NAWMP Plan Committee 1998) advocated explicitly for evaluations of biological founda-

1 E-mail: mbrasher@ducks.org
2 Present address: Gulf Coast Joint Venture, National Wetlands Research Center, 700 Cajundome Boulevard, Lafayette, LA 70506, USA
3 Present address: AMEC Earth and Environmental, 960 Kingsmill Parkway, Suite 104, Columbus, OH 43229, USA

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