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Harmon, David, ed. 2006. *People, Places, and Parks: Proceedings of the 2005 George Wright Society Conference on Parks, Protected Areas, and Cultural Sites*. Hancock, Michigan: The George Wright Society.

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An Assessment of White-tailed Deer (*Odocoileus virginianus*) and Feral Hog (*Sus scrofa*) Populations at Big Thicket National Preserve, Texas

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Introduction

Big Thicket National Preserve, composed of roughly 86,000 ha, is the first national preserve established by Congress and was set aside in 1974 primarily to protect its biological diversity as opposed to its scenic or recreational resources (NPS 1996). The preserve's enabling legislation, however, also mandates that recreational hunting be permitted within its boundaries (NPS 1996). Hunting within the preserve (Figure 1) is permitted within the Big Sandy Creek, Beech Creek, Lance Rosier, Beaumont, Jack Gore Baygall, and Neches Bottom units. Hunting activity in the preserve is regulated via a permit system administered by park staff. Each unit is allotted a specific number of permits according to sustainable game-harvest population estimates determined by the preserve's resource managers. An evaluation of the efficacy of current management guidelines for the hunting program is done every five years. The number of permits given for particular units, and maximum allowable harvest rates for game species, is revised continually upon analysis of short- and long-term harvest rate trend information gathered from hunter survey cards (Chavarria et al 2004). The information gathered from these surveys also serves as a means of projecting population trends of game species and their potential impacts to resources in the national preserve. An updated assessment, conducted in 2004, of the population trends of two large game species in the preserve—the white-tailed deer (*Odocoileus virginianus*) and feral hog (*Sus scrofa*)—was an important component to continuing the sound management of resources in the national preserve.

Methods

Harvest survey cards submitted by individual hunters report the number of animals harvested and the number of trips each hunter made to a particular unit. This information is used to calculate harvest effort—a measure of the number of animals harvested per unit of hunter trips. Harvest effort can be used as an index to population abundance and trends (Caughley and Sinclair 1994). From hunter card survey data, we determined hunter effort (number game harvested/100 trips) by species, unit, and period for the preserve (Chavarria et al. 2004). Due to breaks in the sequence of data for some units and years, we categorized data approximately into five-year periods: 1980–1984, 1985–1989, 1990–1994, 1995–1999, and 2000–2003. Periods will be referred to by the first year of data collected (e.g., 1980 = 1980–1984, etc.). Annual estimates were averaged by period. When hunter

Figure 1. Management units of Big Thicket National Preserve, 2004.

effort is standardized, these indices can be used to compare relative differences in abundances between areas, provided that a few basic assumptions are met (Caughley 1977). One critical assumption in use of this index is that the number of hunters has not changed significantly over the 23-year period of interest. A review of the average number of permits issued and average number of hunters for each unit supports this assumption. Changes in hunter effort between periods, therefore, would track changes in population abundance (Caughley 1977; Caughley and Sinclair 1994).

Results

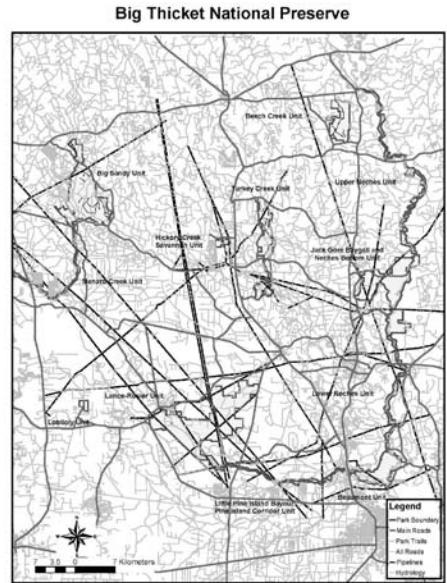
Hunting program trends. Since 1981, the number of permits issued for all six management units has been fairly consistent. The hunter card survey return rate is high (>59%).

Harvest trends. Harvest rates for white-tailed deer have increased slightly over the past 20 years (Figure 2). Harvest effort for white-tailed deer appears to be relatively stable in recent years, suggesting that the deer population is stable under current harvest rates (Chavarria et al. 2004). Harvest rates have increased dramatically, by nearly three-fold, for feral hogs over the past twenty years ($F=20.96$, $P<0.001$) (Figure 3). Increased observations of feral hog numbers in the preserve support the premise that population numbers have increased. Feral hog population numbers have increased generally in all the units where hunting is permitted. Future management of feral hog populations will likely be necessary to reduce impacts of the species on native wildlife and vegetation.

In comparing harvest effort among periods and units, we found differences in effort for white-tailed deer for units ($F=10.26$, $P<0.001$) and periods ($F=5.16$, $P=0.005$). Harvest effort in the Beech Creek unit was lower than that in the Neches Bottom unit; all others were similar. Harvest effort for white-tailed deer was lower in Period 1980 but similar in all other periods (Figure 2). The population growth rate for white-tailed deer has slightly declined, but remained relatively stable over the past 20 years (Figure 4). The population growth rate for feral hogs has consistently increased ($r>0$) over the past 20 years (Figure 4).

Management implications

Manage health of vegetative communities. Several rare and federally listed endangered plants are found within the park boundaries, including bog coneflower (*Rudbeckia scabrifolia*), Navasota ladies-tresses (*Spiranthes parksii*), Texas trailing phlox (*Phlox nivalis* var. *texensis*), and white firewheel (*Gaillardia aestivalis* var. *winkleri*) (NPS 1996). The preserve must manage for protecting these species and other native vegetation from excessive



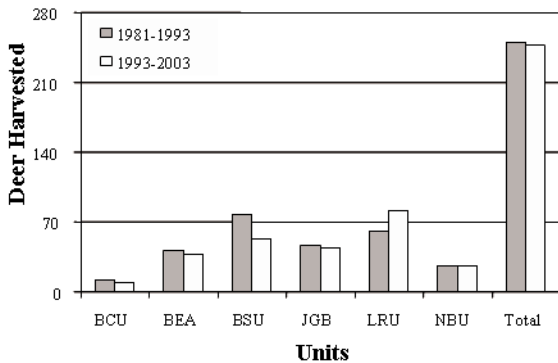


Figure 2. Harvest rates of white-tailed deer in Big Thicket National Preserve, 1981-2003..

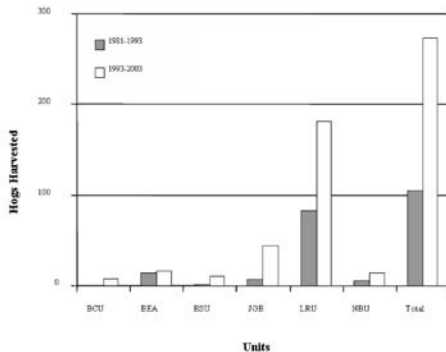


Figure 3. Harvest rates of feral hogs in Big Thicket National Preserve, 1981-2003.

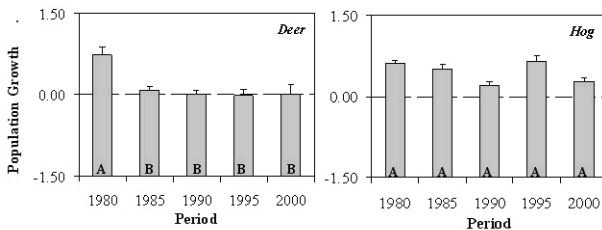


Figure 4. Projected population trends (exponential rate of increase, r) for white-tailed deer and feral hogs calculated from 1981-2003 harvest data, Big Thicket National Preserve.

herbivory associated with native or exotic fauna. Current trends of abundance and rates of population growth of feral hogs in the preserve pose an increased threat to the health of native vegetation in the preserve.

Protect native wildlife populations. The preserve is responsible for maintaining healthy and stable populations of its native wildlife. This is particularly important to species directly affected by legalized sport hunting within the preserve, such as rabbits, squirrels, and white-tailed deer. The assessment of harvest rates from the past 20 years indicates that the preserve has adequately managed stable populations of white-tailed deer, but the increase in the number of feral hogs may pose a competitive threat to other wildlife in the preserve that overlap in resource utilization.

Control exotic wildlife, reduce associated impacts. The Texas Animal Damage Con-

rol Service notes that if the feral hog is not properly managed, it has the potential of causing extensive damage (Figure 5) to native wildlife, habitat, and agricultural resources (Beach 1993). Miller (1993:12) describes the many forms of damage caused by feral hogs as “rooting and feeding on forest regeneration sites, row crop and pasture lands and food plots or plantings for wildlife; damage to ponds, tanks, springs and water holes; damage to wild ecosystems and threats to biodiversity; competition with other preferred wildlife species, [both] game and non-game; predation on other wildlife and domestic animals; and, disease threats to domestic livestock and humans.” Revision of current management practices for controlling feral hogs at Big Thicket National Preserve will be necessary to reduce their associated impacts to native flora and fauna—especially those which are listed as threatened and/or endangered by state or federal authorities.



Figure 5. Wallowing and rooting damage to soils and native vegetation associated with increased feral hog abundances in Big Thicket National Preserve, 2004.

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