

STATUS OF REGIONAL MOOSE POPULATIONS IN EUROPEAN AND ASIATIC RUSSIA

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ABSTRACT: The moose population in Russia contains 4 subspecies and peaked at >800,000 animals in 1990. A substantial population decline of >50% occurred in European Russia between 1990 and 2002; populations in Asiatic Russian have remained more stable. This decline was influenced by the relationships among population densities of moose and humans, available forest habitat, and exploitation of moose. In general, fluctuations in moose populations were lower in areas with more forest habitat and lower human density.

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Key words: *Alces alces*, distribution, decline, fluctuation, human impacts, moose, populations, Russia.

There are an estimated 14.4 million km² of moose habitat in Russia. Four subspecies of moose have been documented in Russia including 1) *Alces alces alces* Linnaeus 1758 found in European Russia, the Ural mountains, western Siberia, and the Altai mountains, 2) *A. a. pfizenmayeri* Zukowski 1910 that occupies the area east of the Yenisey River to the Chersky Mountain Range, 3) *A. a. buturlini* (Chernyavsky and Zhelesnov 1982) that is distributed throughout northeast Siberia, and 4) *A. a. cameloides* Milne-Edwards 1867 that occupies the Amur region and the Sikhote-Alin Mountain range (Chernyavsky and Zheleznov 1982, Heptner 1989) (Fig. 1). The various ecoregions that moose inhabit include the

tundra, subarctic, subarctic-regime mountains, warm continental, warm continental-regime mountains, prairie, prairie-regime mountains, and temperate steppe (Bailey 1998).

The population density of moose is influenced by human population density and associated hunting pressure. Moose populations in European Russia declined in the late 20th century (Baskin 1998) and are predicted to continue declining in the early 21st century (Lomanov 1995). The State Centre for Game Animal Control (Borisov et al. 1992, Danilkin 1999, Lomanov and Lomanova 1996, 2000, 2004, Lomanova 2007) has provided useful data to interpret population dynamics of moose in Russia, and specific regional factors have



Fig. 1. The range and population estimates (in thousands) of the 4 subspecies of moose found in Russia (from Lomanova 2007).

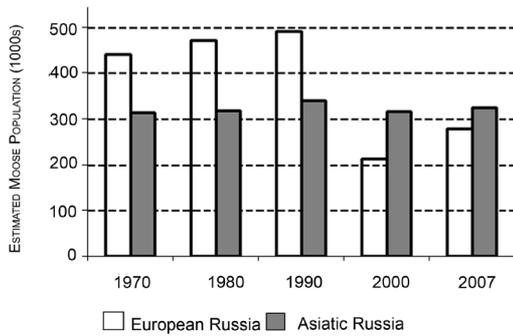


Fig. 2. The estimated moose populations in European and Asiatic Russia, 1970-2007 (from Borisov et al. 1992, Danilkin 1999, Lomanov and Lomanova 1996, 2000, 2004, Lomanova 2007).

been identified that influence moose populations. In addition, national data about human population density and distribution, and regional forest inventories have been used to analyze anthropogenic factors that influence moose populations in Russia.

The highest estimated moose population (833,000) in Russia occurred in 1990 (Fig. 2). The 2007 population was estimated to be about 600,000 with the overall populations in European and Asiatic Russia about equal (Fig. 1 and 2). There was a substantial decline in the overall moose population from 1991 to 2002, with greatest decline (>50%) in European Russia; the Asiatic population remained stable at about 300,000 (Fig. 2). Since 2002, the population has increased in European Russia and remained reasonably stable in Asiatic Russia (Fig. 2). Current (2007) regional population densities vary;

those in European Russia are generally higher than those in Asiatic Russia (Fig. 3). Concurrent with increasing populations in European Russia, moose populations in southern regions have also recovered, particularly in forest-steppe habitats and neighboring Ukraine and Kazakhstan (Erzhanov 2008, Minoranskiy et al. 2009, Volokh 2009).

The fluctuation in moose density appears to correlate with the amount of forest cover available in different regions. For example, dramatic fluctuations in moose population density have been negligible in Yakutia that has ample forest habitat and low human population density (Boeskorov et al. 2008). Areas with high forest cover tend to have the highest moose density and more population stability (Fig. 4 and 5). Of 45 regions in European Russia with higher human population density, 42 experienced population declines from 1990 to 2002; conversely, 36 regions had population increases and only 6 declined from 2002 to 2007 (Fig. 4). Of 28 regions in Asiatic Russia with relatively low human population density, only 5 had population declines and 22 had increases from 1990 to 2002; 14 regions had increases and 11 declines from 2002 to 2007 (Fig. 5). Both population declines and increases in Asiatic Russia were much smaller on a relative scale than those in European Russia (Fig. 4 and 5). The relationships among moose population density, forest habitat availability, human population density, and exploitation of moose populations require further study to evaluate and predict the future

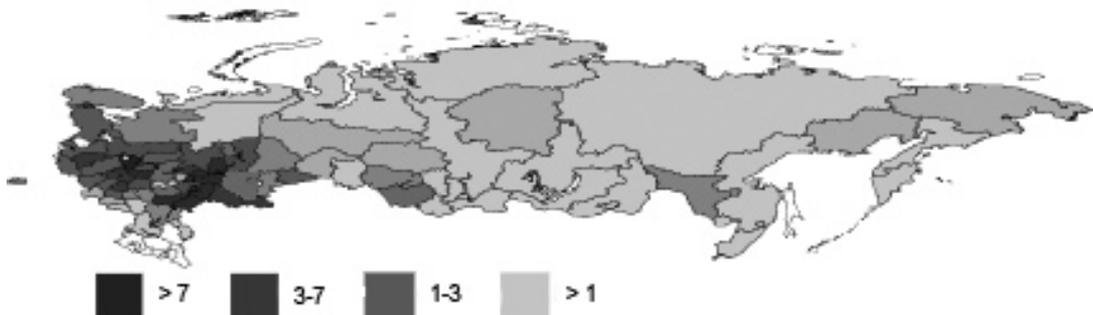


Fig. 3. The estimated regional population densities of moose in Russia (moose/km²; from Lomanova 2007).

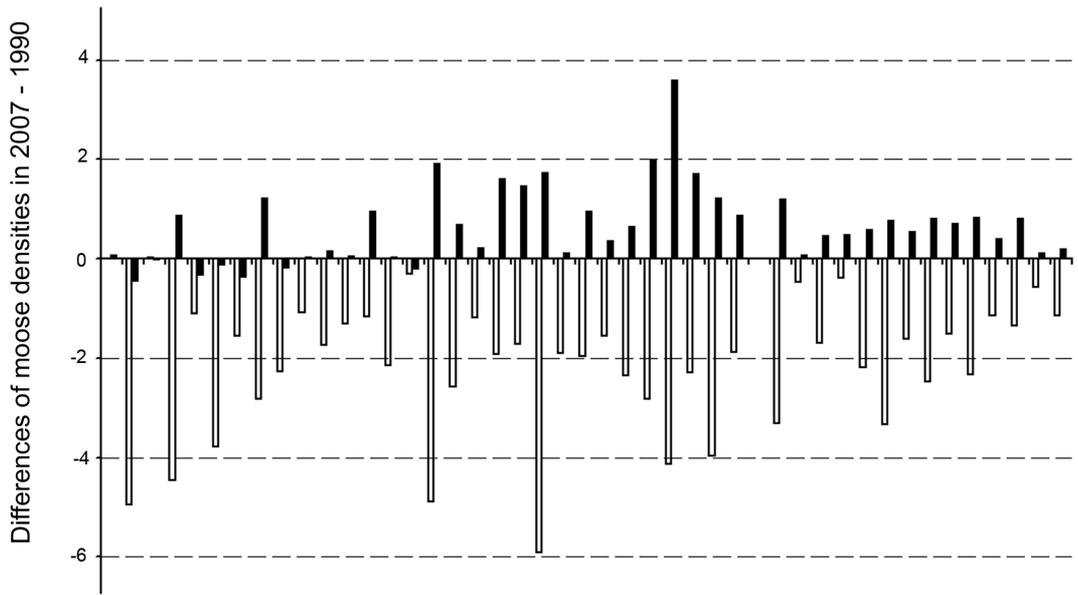


Fig. 4. The relative change in moose density in 45 regions of European Russia; regions are listed left to right by increasing amount of forest area. Open boxes represent moose density in 2002 minus moose density in 1990; shaded boxes represent moose density in 2007 minus moose density in 2002.

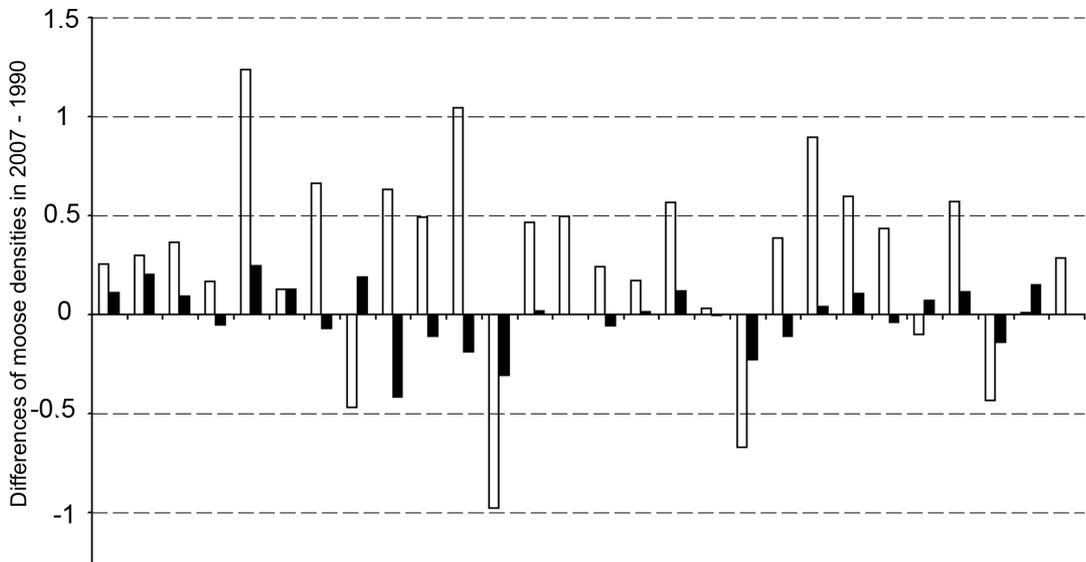


Fig. 5. The relative change in moose density in 28 regions of Asiatic Russia; regions are listed left to right by increasing amount of forest area. Open boxes represent moose density in 2002 minus moose density in 1990; shaded boxes represent moose density in 2007 minus moose density in 2002.

of regional Russian moose populations.

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