

# Annotated Bibliography

Michigan Society of American Foresters  
Forests & Whitetails-Striving for Balance Conference

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This bibliography has been assembled for those wishing to learn more about ungulate impacts on forest ecosystems. The Conference organized by the Michigan Society of American Foresters highlighted only some of the major themes related to the conference topic, due to time constraints. The depth and breadth of research goes far beyond what was presented during the conference. The papers annotated herein have been sorted into four categories for ease of reference (listed below). A few papers are listed in more than one category. This bibliography is not intended to be a comprehensive list of the vast amount of research addressing the issues involved with forests and ungulate impacts. Rather, an attempt has been made to catalogue representative papers, benchmark papers, and those often cited in ongoing research.

1. Natural Resource Impacts
  2. Methodologies to Address Deer "Overabundance"
  3. Ungulate Population Biology/Ecology
  4. Other Topics or Mixed Topics
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## Natural Resource Impacts

**Alverson, W.S., D.M. Waller, and S.L. Solheim. 1988.** Forests too deer: Edge effects in northern Wisconsin. *Conservation Biology* 2: 348-358.

[[www.botany.wisc.edu/waller/deer/Foreststoodeer.pdf](http://www.botany.wisc.edu/waller/deer/Foreststoodeer.pdf)]

*A classic study demonstrating loss of hemlock and yew reproduction and recruitment across northern Wisconsin and the Upper Peninsula of Michigan. Deer densities as low as 4/km<sup>2</sup> (10/m<sup>2</sup>) may prevent regeneration of hemlock, yew, and northern white cedar. States deer densities of 8/km<sup>2</sup> (21/m<sup>2</sup>) is far too high to maintain full diversity, and tentatively recommended densities below 4/km<sup>2</sup> (10/m<sup>2</sup>).*

**Alverson W.S. and D.M. Waller. 1997.** Deer populations and the widespread failure of hemlock regeneration in northern forests. pp. 280-297 in W. McShea and J. Rappole, eds., *The Science of Overabundance: Deer ecology and population management*, Smithsonian Inst. Press, Washington, DC. [[www.botany.wisc.edu/waller/deer](http://www.botany.wisc.edu/waller/deer)]

*A classic case study in browse impact. Challenged, in part, by Mladenoff & Stearns (1993). However, Rooney and others have done subsequent research reinforcing the negative role of deer browsing on hemlock, and other species.*

**Brandner. T.A., R.O. Peterson, and K.L. Risenhoover. 1990.** Balsam fir on Isle Royale: Effects of moose herbivory and population density. *Ecology* 71: 155-164.

*Low fir densities, heavy height suppression by moose. High fir densities recruited during periods of moose lows. Peak moose numbers in the 1920s. Also see Risenhoover & Maass (1986).*

*A paper delivered at the Michigan Society of American Foresters "Forests & Whitetails-Striving for Balance" Conference  
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**Case, D.J. and D.R. McCullough. 1987.** The white-tailed deer of North Manitou Island. *Hilgardia* 55 (9): 1-57.

*A population dynamics study of introduced deer onto the island (part of Sleeping Bear Dunes N.P.). The irruptions did not follow the classical pattern described by A. Leopold. Of odd note, the second irruption was partially supported by deer feeding on alewives washed-up along the shores of the island. Demonstrated high rate of increase despite poor range conditions. Definite changes in habitat quality. Includes herbaceous data. No "balance" predicted. Dave Flaspohler (MTU) is doing current work on the island.*

**Cote S.D., T.P. Rooney, J.P. Tremblay, C. Dussault & D.M. Waller. 2004.** Ecological impacts of deer overabundance. *Annual Review of Ecology Evolution and Systematics* 35: 113-147. (preprint). [[www.botany.wisc.edu/waller/deer](http://www.botany.wisc.edu/waller/deer)]

*An excellent comprehensive review of economic losses, ecological impacts (vegetation structure, composition, diversity, indirect/cascading effects, nutrient/water cycling, successional shifts, alternative stable states, vegetation recovery potential, etc.), research needs, management needs (including adaptive management, hunting, social values, etc.), and other topics. Very good citation list. Also see Healy, deCalesta, & Stout (1997).*

**deCalesta, D.S. 1992.** Impact of deer on species diversity of Allegheny hardwood stands. *Proceedings of the Northeastern Weed Science Society Abstracts* 46: 135.

**deCalesta, D.S. 1994.** Impact of white-tailed deer on songbirds within managed forest in Pennsylvania. *J. Wildlife Mngt.* 58: 771-718.

*A classic enclosure study about "cascading" or "indirect" effects of herbivory across several habitat conditions and deer densities. Species abundance more sensitive than species richness. Four deer densities, 3 silvicultural treatments, 10 years of browsing. Often cited. See Tilghman (1989).*

**DeGraaf, R.M., W.M. Healy, and R.T. Brooks. 1991.** Effects of thinning and deer browsing on breeding birds in New England oak woodlands. *Forest Ecology and Mngt.* 41: 179-191.

*Impacts of thinning & deer browsing on bird populations at the Quabbin Reservoir in Massachusetts. Three oak stands in each of four treatments. Thinned stands with more birds. Six (out of 65) species differed among treatments (hermit thrush, rufous-sided towhee, American redstart, red-eyed vireo, ovenbird, veery). Thinning has more impact on bird populations than high deer densities.*

**Frelich, L.E. and C.G. Lorimer. 1985.** Current and predicted long-term effects of deer browsing in Michigan, USA. *Biological Conservation* 34: 99-120.

*Study at Porcupine Mountains State Park, where browsing seems to be major cause of hemlock regeneration decline and not seedbed conditions or changing climate. Mixed results across study areas. Developed a "sugar maple deer browse index" to help assess local level of browsing pressure, used by other researchers. Effect and relative importance of deer browse pressure challenged by Mladenoff & Stearns (1993).*

**Healy, W.M., D.S. deCalesta, and S.B. Stout. 1997.** A research perspective on white-tailed deer overabundance in the northeastern United States. *Wildlife Society Bulletin* 25:259-263.

*Speaks about value judgment bases, large body of literature, direct & indirect effects of overbrowsing, hunters/hunting, ecosystem emphasis, stand level impacts, adaptive management, research/management merger, etc. Cites 4 research areas. Complements Cote, et al, 2004.*

**Healy, W.M. 1997.** Influence of deer on the structure and composition of oak forests in central Massachusetts. *in* McShea, et al. 1997. *The science of overabundance.* Smithsonian Institution. pp. 249-266.

*An interesting study of the protected Quabbin Reservoir compared to hunted lands around the preserve. Demonstrates significant browse effects of deer. See DeGraaf, et al. (1991).*



**Jones, S.B., D.S. deCalesta, and S.B. Chunko. 1993.** Whitetails are changing our woodlands. *American Forests* 99: 20-25, 53-54.

*A good popular press article that brings many of the issues to print.*

**Marquis, D.A. and R. Brenneman. 1981.** The impact of deer on forest vegetation in Pennsylvania. U.S. Forest Service General Technical Bulletin NE-65.

*One of the first early comprehensive reports of deer impacts supported by research. Primarily a timber & silvicultural perspective. Marquis was a key contributor to forest management techniques and recommendations for northeastern forests.*

**Marquis, D.A. and T.J. Grisez. 1978.** The effect of deer exclosures on the recovery of vegetation in failed clearcuts on the Allegheny Plateau. U.S. Forest Service Research Note NE-270.

*Regeneration failure in these clearcuts was a driving factor in developing management recommendations for forest with high deer densities, and as evidence for the need to reduce deer density goals. See Marquis, Ernst, & Stout (1992).*

**Millers I., D.S. Shriner, and D. Rizzo. 1989.** History of hardwood decline in the eastern United States. U.S. Forest Service General Technical Bulletin NE-197.

*A comprehensive review of hundreds of documents and reports regarding declines of major hardwood species with numerous maps and tables. While not related to deer damage, the impact of non-deer factors in forest declines is certainly evident and is well-documented in this report. Includes oaks, maples, birches, ashes, beech, aspens, cottonwood, black cherry, shagbark hickory, sweetgum, yellow-poplar, and eastern white pine. The report also talks about the early forest and various abiotic causes of decline and pre-disposition towards decline (stress factors, mortality factors, atmospheric deposition, etc).*

**Mladenoff, D.J. and F. Stearns. 1993.** Eastern hemlock regeneration and deer browsing in the Northern Great Lakes Region: A re-examination and model simulation. *Conservation Biology* 7: 889-900.

*Revisits hemlock regeneration issues, especially Alverson, Waller, & Solheim (1988), and challenges some of the underlying reasons for regeneration/recruitment failure. Modeling suggests other factors more responsible. Advocates ecosystem approach to management, rather than single species management. See also Anderson & Katz (1993) and Rooney, et al. (2004).*

**Porter, W.F. 1991.** White-tailed deer in eastern ecosystems: Implications for management and research in national parks. Natural Resources Report NPS/NRSUNY/NRR-91/05, Denver, Colorado

*Porter has many publications about deer impacts on protected resources in National Parks and in other protected areas. One of the major forest-deer issues involves the role of deer on endangered and threatened species reserves, and the management/intervention role in National Parks (and parks with similar objectives). Gettysburg, Eisenhower, Saratoga, Shenandoah, Smokey Mtns. are examples where studies are available.*

**Porter, W.F., M.C. Coffey, and J. Hadidian. 1994.** In search of a litmus test: Wildlife management on the U.S. national parks. *Wildlife Society Bulletin* 22: 301-306.

*Deer browsing has seriously compromised eastern park objectives regarding preservation or maintenance of natural ecosystems (often remnant pieces). Policy dilemma. Political barriers to deer control and lack of specific local indicators based on research. An example of the body of research illustrating deer browse problems in parks and natural reserves.*



**Risenhoover, K.L. and S.A. Maass. 1986.** The influence of moose on the composition and structure of Isle Royale forests. Canadian J. of Forest Research 17: 357-364.

*Very high moose populations on Isle Royale have had major impacts on the vegetation, including balsam fir. Exclosure study, four exclosures from 1949/50, three forest types. Stem densities grazed to short, dense condition. Variable results by species, woody species only. Moose slow succession. Reduced vertical structure. Also see Brandner, et al. (1990).*

**Rooney T.P., S.L. Solheim, and D.M. Waller. 2002.** Factors influencing the regeneration of northern white cedar in lowland forests of the Upper Great Lakes region, USA. Forest Ecology and Management 163: 119-130. [[www.botany.wisc.edu/waller/deer](http://www.botany.wisc.edu/waller/deer)]

*Study from the western U.P. and northern Wisconsin. 77 stands, regional scale, multiple deer densities, two survey years. Takes 30 years to recruit to 3 meters (above deer reach). Regeneration density and deer browse were major factors in regeneration and recruitment. Browsing was demonstrated to be a regional factor in depressing regeneration.*

**Rooney, T.P., S.M. Wiegmann, D.A. Rogers, and D.M. Waller. 2004.** Biotic impoverishment and homogenization in unfragmented forest understory communities. Conservation Biology 18: 787-798.

*Demonstrated the ability of deer to remove browse-sensitive species from forests, indirectly promote generalist species less preferred by deer, resulting in a loss of biodiversity across a landscape. Concept of "biotic homogenization". Revisited selected Curtis' plots from 1959. Considers hunting pressure in browse abatement. Eliminated succession as a cause. Greatest loss in "protected" areas where hunting does not occur. See also Alverson, et al. (1988), Mladenoff & Stearns (1993), and Anderson & Katz (1993).*

**Rooney, T.P. and D.M. Waller. 2003.** Direct and indirect effects of deer in forest ecosystems. For. Ecol. Manage. 181: 165-176. [[www.botany.wisc.edu/waller/deer/Davos.pdf](http://www.botany.wisc.edu/waller/deer/Davos.pdf)]

*Direct effects (e.g. tree regeneration, understory flora) and indirect/cascading effects (e.g. food chains, change in plant interactions such as sedge & hay-scented fern, habitat changes, nutrient cycling, etc.). Poses several good questions for future directions/study. Many examples cited. Excellent reference list.*

**Sage, R. W., W. F. Porter, and H. B. Underwood. 2003.** Windows of opportunity: white-tailed deer and the dynamics of northern hardwood forests of the northeastern US. Journal for Nature Conservation 10:213220.

**Tilghman, N.G. 1989.** Impacts of white-tailed deer on forest regeneration in northwestern Pennsylvania. J. Wildlife Mngt. 53: 524-532.

*An excellent and often cited paper because the project used controlled and variable deer density impacts across a range of habitat or forest types, 5 deer densities across 3 silvicultural treatments, 5 years. Deer are major cause of regeneration failure. Related to deCalesta 1994. Recommends deer densities <18/m<sup>2</sup>.*

## **Methodologies to Address Deer "Overabundance"**

**Behrend, D.F., G.F. Mattfeld, W.C. Tierson, and J.E. Wiley III. 1970.** Deer density control for comprehensive forest management. J. Forestry 68: 695-700.

*The use of public hunting on a private ownership to reduce deer densities and facilitate tree regeneration. The Archer & Anna Huntington Wildlife Forest Station (15,000 acres) in the Adirondack Mountains. Objective was to reduce deer densities from ~27/m<sup>2</sup> to 13-14/ m<sup>2</sup>. Private ownership and limited hunting pressure represents one of the barriers to meeting regional or landscape deer density goals. Substantial reductions in deer density in some areas did not immediately "back-fill" from deer migration (elimination of maternal groups). An interesting case study. See also Mathews & Porter (1993).*

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**deCalesta, D.S. and S.L. Stout. 1997.** Relative deer density and sustainability: A conceptual framework for integrating deer management with ecosystem management. *Wildlife Soc. Bull.* 25: 252-258.

*Well articulated paper regarding relative deer density to set population management goals using ecosystem parameters. There are multiple levels at which deer densities can be managed with varying impacts to diversity, timber production, and sustained deer yield. Absolute population goals will vary with habitat quality. See also Healy, et al. (1997) and Cote, et al. (2004).*

**Dessecker, D.R. and R.H. Yahner. 1987.** Breeding bird communities associated with Pennsylvania northern hardwood clearcut stands. *Proceedings Pennsylvania Academy Science* 61: 170-173.

**Frawley, Brian. 2004.** Michigan Deer Harvest Survey Report 2003 Seasons. Michigan DNR Wildlife Report 3418. [[www.michigan.gov/documents/deer\\_03harvest\\_93353\\_7.pdf](http://www.michigan.gov/documents/deer_03harvest_93353_7.pdf)]

*Deer hunter survey. 743,000 hunters, similar to 2002. About 500,000 deer harvested, up 5% from 2002. Hunter success was 45%. No mention of deer populations or management goals.*

**Healy, M.H., D.S. deCalesta, and S.L. Stout. 1997.** A research perspective on white-tailed deer overabundance in the northeastern United States. *Wildlife Society Bulletin* 25(2): 259-263.

*A brief research perspective article. Four research approaches; 1) modeling deer impacts on the ecosystem components, 2) better estimates of deer impact at the stand level, 3) methods of regulating deer populations, and 4) better understanding of the human dimensions. Proponent of adaptive management. See also Cote et al. (2004), deCalesta & Stout (1997), Sinclair (1991), MacNab (1983), and others.*

**Latham, R.E., J. Beyea, M. Brenner, C.A. Dunn, M.A. Fajvan, R.R. Freed, M. Grund, S.B. Horsely, A.F. Rhoads, and B.P. Shissler. 2005.** Managing white-tailed deer in forest habitat from an ecosystem perspective: Pennsylvania Case Study. Report by the Deer Management Forum for Audubon Pennsylvania and Pennsylvania Habitat Alliance, Harrisburg. xix + 340 pp. [<http://pa.audubon.org/ExecutiveSummary.pdf>]

*A controversial benchmark document (executive summary) of some of the paradigm-changing work spearheaded by Dr. Gary Alt; whose team has done much to overcome some of the socio-political challenges in managing deer populations in Pennsylvania. Pennsylvania forest-deer management is a showcase for the rest of the eastern USA.*

**Marquis, David A. 1981.** Management of Allegheny hardwoods for timber and wildlife. In *Proceedings, 17th IUFRO World Congress: Division 1. Forest environment and silviculture.* Kyoto, Japan, 1981 September 6-17. Kyoto, Japan. Japan IUFRO Cong. Comm. 17: 369-380.

*Outlines fundamental strategies in regenerating commercial tree species under heavy browsing pressure. Strategy is to overwhelm deer with advanced regeneration in excess of 100,000 seedlings/hectare. Better sites and larger proportions of harvest area result in greater success. Even-aged management is standard. Recognized high deer densities should be a temporary phenomenon that must be reduced through better agency cooperation.*

**Marquis, D.A., R.L. Ernst, and S.L. Stout. 1992.** Prescribing silvicultural treatments in hardwood stands of the Alleghenies (revised). U.S. Forest Service General Technical Report NE-96. 102 pp.

*The result of ~25 years of silvicultural research in the northeast on how to regeneration commercial tree species under browse pressure from overabundant deer. Many of the commercial species of the NE are earlier in a successional path than many commercial species in the Lake States, especially sugar maple. The silviculture involves site assessments, clearcutting, and a "forage saturation" concept. Differences of Lake States forests, traditional silviculture, and social acceptance will present challenges.*

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**MacNab, J. 1983.** Wildlife management as scientific experimentation. Wildlife Society bulletin 11: 397-401.

*An "adaptive management" concept where wildlife management is designed using an experimental framework to test ecosystem/landscape hypotheses and gather landscape level data for management direction. See also Cote et al. (2004), Healy et al. (1997), deCalesta & Stout (1997), Sinclair (1991), others.*

**Martin, J and C. Baltzinger. 2002.** Interaction among deer browsing, hunting, and tree regeneration. Canadian J. Forest Resources 32: 1254-1264.

*Demonstrates a link between hunting pressure and commercial tree regeneration, although the example is with black-tailed deer and western red-cedar, sitka spruce, & western hemlock in the Queen Charlotte Islands of British Columbia. Suggests that actual kill-count may be less important than the "fear factor" in affecting deer behavior.*

**Miller, R.O. 2004.** Regeneration in a heavily browsed northern hardwood stand twelve years after scarification and fencing. Michigan State University Upper Peninsula Tree Improvement Center Research Report. [[www.maes.msu.edu/uptic](http://www.maes.msu.edu/uptic)]

*A multiple treatment exclosure study in a 35-acre northern hardwood stand. Results show fencing increased density, richness, and diversity of herbaceous and woody plants. Electric fencing used costs \$2.00 per linear foot.*

**Rooney T.P. and D.M. Waller. 2001.** How experimental defoliation and leaf height affect growth and reproduction in Trillium grandiflorum. Journal of the Torrey Botanical Society 128: 393-399. [[www.botany.wisc.edu/waller/deer/RooneyWaller01.pdf](http://www.botany.wisc.edu/waller/deer/RooneyWaller01.pdf)]

*A possible "indicator" species to better assess specific site impacts of deer herbivory. Clintonia borealis has also been suggested (Balgooyen & Waller, 1995).*

**Sinclair. A.R.E. 1991.** Science and the practice of wildlife management. J.Wildlife Mngt. 55: 767-772.

*An earlier advocacy of "adaptive management" or applying scientific methodology to designed management practices at the landscape level. Use wildlife management as scientific experimentation to further understand complex landscape scale dynamics. Complements Cote et al. (2004), Healy et al. (1997), deCalesta & Stout (1997), MacNab (1983), others.*

**Welsh, C.J.E. and W.M. Healy. 1993.** Effect of even-aged timber management on bird species diversity and composition in northern hardwoods of New Hampshire. Wildlife Society Bulletin 21: 143-154.

*Response/emphasis on recommendations by Marquis & Stout (area effects). Compared managed and unmanaged forests, more from the silvicultural impacts on bird presence, than the effects of deer browsing.. Species richness lower in reserved areas (where herbivory effects more pronounced). Species abundance differences not observable.*

**Wisconsin DNR. 1995.** Deer populations goals and harvest management environmental assessment. Eds. W. Vander Zouwen and K. Warnke.

*A benchmark EA that identifies the range of factors in considering forest affects of deer densities. Illustrates a range of research and data acquisition needs. An excellent framework for further work.*



## Ungulate Population Biology/Ecology

**Davidson, W.R. and G.L. Doster. 1997.** Health Characteristics and white-tailed deer population density in the southeastern United States. *in* McShea, W.J., H.B. Underwood, and J.H. Rappole. 1997. The science of overabundance; deer ecology and population management. Smithsonian Book. pp. 164-184.

*A review that illustrates the many variables involving the density-dependence of disease prevalence in deer populations across a wide range. Not all relationships are intuitive.*

**Halls, L.K. 1984.** White-tailed deer: Ecology and management. Stackpole Books.

*An often-cited text with a collection of papers about deer.*

**Leopold, A. 1943.** Deer irruptions. Wisconsin Conservation Bulletin 8 (8): 3-11.

*An early classic in describing irruptive behaviors of ungulates. The spike-crash-stabilization model has been challenged (see McCullough's George Reserve papers, Case & McCullough(1987), May (1977), and other non-Leopold models in the literature, too).*

**Leopold, A. 1933.** Game Management. Charles Scribner's Sons. 481 pp.

*A classic text on game management that has tremendous influence on wildlife management philosophy in the USA. Some of the components of Leopold's work have been challenged and/or modified over the decades.*

**Lubow, B.C. and B.L. Smith. 2004.** Population dynamics of the Jackson Elk Herd. J. Wildlife Mngt. 68 (4): 810-829.

*The Jackson Elk Herd (Yellowstone National Park) is a classic subject of population studies. Suggests that increased cow harvest is necessary to maintain herd size with current management policies.*

**Mathews, N.E. and W.F. Porter. 1993.** Effect of social structure on genetic structure of free-ranging white-tailed deer in the Adirondack Mountains. J. Mammalogy 74: 33-43.

*An example of a study relating genetic lineage with social behavior of deer. Although breeding occurs on summer ranges, winter range populations have similar genetics. The authors suggest this is due to social structure centering on females. Application to deer density may include the notion that removal of matrilineal group may not result in immediate deer density recovery, thus allowing an opportunity for range recover (but the sufficient number of recovery years needed remain elusive). See Behrend, et al (1970).*

**May, R.M. 1977.** Thresholds and breakpoints in ecosystems with a multiplicity of stable states. Nature 269: 471-477.

*"Stable" populations may have more than one population level, contrary to some of the classic ideas about carrying capacity and population stability. Deer may be an example of a species that can demonstrate multiple stable population levels, at least in some situations. See also deCalesta & Stout (1997), Healy, et al. (1997) and Cote, et al. (2004).*

**McCullough, D.R. 1979.** The George Reserve deer herd: Population ecology of a K-selected species. University of Michigan Press, Ann Arbor.

*The George Reserve is located in southern Michigan and was the experimental site of deer population studies. Six deer in 1928, 222 in 1935, reduction to 10 by 1975, 212 by 1981. Results are often cited in research papers. An excellent captive herd case study. Many papers came out of the George Reserve research.*



**McCullough, D.R. 1982.** Population growth rate of the George Reserve deer herd. *J. Wildlife Mngt.* 46: 1079-1083.

*The George Reserve studies are benchmarks in the field of understanding population dynamics of white-tail deer. Six deer in 1928, 222 in 1935, reduction to 10 by 1975, 212 by 1981. Data show two irruptions with little suggestion of stabilization. Apparent vegetation recovery between spikes, in terms of forage quantity (no diversity assessments). Often cited. Also see Van Ballenberghe (1987).*

**McCullough, D.R. 1983.** Rate of increase of white-tailed deer on the George Reserve: A response. *J. Wildlife Mngt.* 47: 1248-1250.

*A response to Van Ballenberghe's challenge to McCullough's 1982 article, an arithmetic error, but defended concepts the study demonstrated. See McCullough (1982) and Van Ballenberghe (1983).*

**MacNab, J. 1985.** Carrying capacity and related slippery shibboleths. *Wildlife Society Bulletin* 13: 403-410.

*MacNab (several authors) helps define and challenge terms commonly used in population dynamics, such as carrying capacity, overpopulation, overharvesting, and overgrazing. With deer, carrying capacity is a moving target defined by a range of variables, and might best be applied in particular applications, rather than across broad landscapes. See also Decker, et al. (1987), Garrot, et al. (1993), and Decker, et al. (1991).*

**Ozoga, J., L.J. Verme, and C.S. Bienz. 1982.** Partuition behavior and territoriality in white-tailed deer: Impact on neonatal mortality. *J. Wildlife Mngt.* 46: 1-11.

*John Ozoga and Lou Verme's work at Cusino is often referenced in studies of deer population dynamics and social structure. The results of many papers have been used in the development of deer population management and, more recently, in Quality Deer Management efforts. K. Miller is another noted authority in deer socio-biology. A good set of references on the topic can found in chapter 9 in the text McShea, Underwood, and Rappole (1997).*

**Ozoga, J.J. and L.J. Verme. 1982.** Physical and reproductive characteristics of a supplementally-fed white-tailed deer herd. *J. Wildlife Mngt.* 46: 281-301.

*Cusino enclosure study, population rose from 23 to 159 deer. Progressively more feed was eaten and summer forage decreased. Better antler development, increased natality. Fawn mortality increased. Doe territoriality and limited fawning space lowered maternal success. Concludes supplemental feeding a viable option for herd and range.*

**Schmitz, O.J. 1990.** Management implications of foraging theory: Evaluating deer supplemental feeding. *J. Wildlife Mngt.* 54: 522-532.

*Compared foraging behavior of naturally wintering and supplementary fed deer. Concluded that supplemental feeding programs are likely inefficient.*

**Skogland, T. 1991.** What are the effects of predators on large ungulate populations? *Oikos* 61: 401-411.

*Thick reading. Generally, there is little evidence that predators can regulate populations. However, predators can limit populations under certain circumstances. "Regulation" and "limiting" are different population effects. Most cases, predators are limited by territoriality. Birth synchrony does not appear to a strategy correlated to predation. Based largely on boreal and African research.*

**Van Ballenberghe, V. 1983.** Rate of increase of white-tailed deer on the George Reserve: A re-evaluation. *J. Wildlife Mngt.* 47: 1245-1247.

*Challenges the outcomes of McCullough (1982). Mostly a methodological error. However, a pair of r-values differ. Also see McCullough (1982, (1983)).*





**Van Deelen, T.R., H. Campa III, J.B. Haufler, and P. Thompson. 1997.** Mortality patterns of white-tailed deer in Michigan's Upper Peninsula. *Journal of Wildlife Management* 61:903-910.

*Patterns in the herds that utilize the Whitefish and Stonington deer yards. 58 of 95 radio-collared deer died from 1992 to 1995, 45% from shooting. 12 of the 58 died from predation (1 wolf kill). Hunting mortality was strongly male-biased. Other mortality didn't differ between sexes. Populations were severely skewed towards females and younger age classes. Looked at age, sex, season, etc. Complements next paper.*

**Van Deelen, T.R., H. Campa III, M. Hamady, and J.B. Haufler. 1998.** Migration and seasonal range dynamics of deer using adjacent deeryards in northern Michigan. *Journal of Wildlife Management* 62:205–213.

*Tracks 95 radio-collared deer for three years. Involves the Whitefish and Stonington deer yards and related to movement between winter and summer ranges. Relates to sex, age, migratory propensity, and socio-behavior. Management implications. Complements previous paper.*

### **Other Topics or Mixed Topics**

**Anderson, R.C. and A.J. Katz. 1993.** Recovery of browse sensitive species following release from white-tailed deer *Odocoileus virginianus* Zimmerman browsing pressure. *Biological Conservation*. 63: 203-208.

*Looked at recovery of hemlock when protected from deer using 12 and 27 year exclosures in northern Wisconsin, and plots on the Menominee Indian Reservation. Only three exclosures. Challenges models done by Mladenoff & Stearns (1993). See also Alverson, et al. (1988), Frelich & Lorimer (1985), and Rooney, et al. (2004).*

**Balگوoyen, C.P. and D.W. Waller. 1995.** The use of *Clintonia borealis* and other indicators to gauge impacts of white-tailed deer on plant communities in Northern Wisconsin. *Natural Areas Journal* 15: 308-318.

*A possible answer to the need to find a metric to assess stand-level impacts of deer (Cote et al., 2004, deCalesta & Stout, 1997). Trillium height has also been considered (Rooney & Waller, 2001 and Rooney & Gross, 2003).*

**Decker, D.J., and T.A. Gavin. 1987** Public attitudes toward a suburban deer herd. *Wildlife Society Bulletin* 15: 173-180.

*Survey of residents in a Long Island, New York community. Emphasized need to understand public attitudes prior to developing education and management programs. Attitudes demonstrated desire to maintain or increase deer numbers, despite increasing car crashes and problems with garden herbivory and Lyme disease. Also, in suburban areas, management practices must be modified from those used in rural areas.*

**Decker, D.J., R.E. Shanks, L.A. Nielsen, and G.R. Parsons. 1991.** Ethical and scientific judgments in management: Beware of blurred distinctions. *Wildlife Society Bulletin* 19: 523-527.

*Threats from animal rights (anti-hunting) advocates. Caution to managers about confusing ethical perspectives with science-based judgments. Also see chapter 4 by Allen Rutberg in McShea, Underwood, & Rappole (1997).*

**Finley, F.C. and S.B. Jones (eds.). 1993.** Penn's woods – change and challenge. *Proceedings of the Penn State Forest Resources Issues.*



**Frawley, Brian J. 2004.** Demographics, Recruitment, and Retention of Michigan Hunters. Michigan Department of Natural Resources, Wildlife Division Report No. 3426. 42 pp. [[www.michigan.gov/documents/michigan\\_hunter\\_demographics\\_104984\\_7.pdf](http://www.michigan.gov/documents/michigan_hunter_demographics_104984_7.pdf)]

*Census of hunting licenses 2000-2002. Looks at age, game type, hunter retention, gender, Michigan region. Many tables & graphs. About 868,000 licenses (not just deer) purchased annually. Hunter numbers down during period, but higher than in 1960s. Michigan hunting is middle-aged male sport, 90% southern Lower Peninsula residents. Deer licenses increasingly dominate purchases.*

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**McShea, W.J., H.B. Underwood, and J.H. Rappole. 1997.** The science of overabundance; deer ecology and population management. Smithsonian Book. 402 p.

*A very good review of "overabundance" issues and research. 23 chapters written by many outstanding experts, covering a wide range of topics. About \$20 from Amazon.com.*

**Michigan Natural Resources Council. 1960.** Relationship of timber and game in forest land management. Annual meeting of the Michigan Natural Resources Council, Civic Center, Lansing, Michigan. 63 pp.

*An intriguing historical view of forests & deer from several perspectives; wood production, hunting economics, ecology, sportsmen, industrial forestry, and coordination of efforts. Addresses social, economic, and scientific values associated with deer/forest issues in Michigan and Wisconsin. Shows that these debates are at least 50 years old.*

**Redding, J.A. 1995.** History of deer population trends and forest cutting on the Allegheny National Forest. Pages 214-224 in *Proceedings of the 10<sup>th</sup> Northcentral Hardwoods Conference*. U.S. Forest Service General Technical Report NE-197.

*Evaluates 70 years of selected browsing. Severe impacts. Suggests increased & sustained deer harvest and increased forage production through timber harvest. Four major changes; 1) dramatic increase in deer densities, 2) composition change in overstory & understory, 3) lower diversity, and 4) seedbed conditions. Begins with pre-settlement conditions.*

**Waller D.M. and W.S. Alverson. 1997.** The white-tailed deer: A keystone herbivore. *Wildlife Society Bulletin* 25: 217-226. [[www.botany.wisc.edu/waller/deer](http://www.botany.wisc.edu/waller/deer)]

*A "keystone" species is one which has major influence on the functions of ecosystems (e.g. succession, water/nutrient cycling, decomposition, etc.). The authors argue that deer are a keystone species in forested landscapes and further research is needed.*



## Website URLs of Reference

- Tom Rooney and Don Waller Deer Research: [www.botany.wisc.edu/waller/deer](http://www.botany.wisc.edu/waller/deer)
- Don Waller Faculty Biography: [www.botany.wisc.edu/waller/bio.htm](http://www.botany.wisc.edu/waller/bio.htm)
- Steeve Cote Research: [www.cen.ulaval.ca/english/scote.html](http://www.cen.ulaval.ca/english/scote.html)
- Proceedings of the Conference on the Impact of Deer on the Biodiversity and Economy of the State of Pennsylvania, 1999: [www.audubon.org/chapter/pa/pa/DCP.htm](http://www.audubon.org/chapter/pa/pa/DCP.htm)
- Michigan Deer Management: [www.michigan.gov/dnr/0,1607,7-153-10319-28543--,00.html](http://www.michigan.gov/dnr/0,1607,7-153-10319-28543--,00.html)
- Pennsylvania Game Commission Deer Management Plan: [www.wpconline.org/dailyphotos/pa\\_game\\_commission\\_deer\\_mgt.pdf](http://www.wpconline.org/dailyphotos/pa_game_commission_deer_mgt.pdf) (56 pp.)
- Environmental Assessment by APHIS, Deer Damage Management in Pennsylvania: [www.aphis.usda.gov/ws/nepa/PAallddeer.pdf](http://www.aphis.usda.gov/ws/nepa/PAallddeer.pdf) (51 pp.)
- EA by APHIS, Deer Damage Management in the Commonwealth of Virginia: [www.aphis.usda.gov/ws/nepa/VAddeer.pdf](http://www.aphis.usda.gov/ws/nepa/VAddeer.pdf) (52 pp.)
- Bemidji State University Conference "White-tailed Deer and the Landscape: An Expanding Relationship?" 2 Dec 2002 (PowerPoint presentations): [www.cri-bsu.org/deerWorkshop.html](http://www.cri-bsu.org/deerWorkshop.html)
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- Kinzua Quality Deer Cooperative Management Plan, August 2002: [www.fs.fed.us/r9/allegheny/forest\\_management/wildlife/kqdc/KQDC2002mgmt\\_plan.pdf](http://www.fs.fed.us/r9/allegheny/forest_management/wildlife/kqdc/KQDC2002mgmt_plan.pdf) (44 pp.)
- Sand County Foundation: [www.sandcounty.net](http://www.sandcounty.net)
- Michigan Deer Management: [www.michigan.gov/dnr/0,1607,7-153-10319-28543--,00.html](http://www.michigan.gov/dnr/0,1607,7-153-10319-28543--,00.html)
- Michigan DNR Wildlife Division: [www.michigan.gov/dnr/0,1607,7-153-10370---,00.html](http://www.michigan.gov/dnr/0,1607,7-153-10370---,00.html)
- Michigan DNR Organizational Chart: [www.michigan.gov/documents/currentorg\\_112205\\_7.pdf](http://www.michigan.gov/documents/currentorg_112205_7.pdf)
- Michigan DNR Mission Statement: [www.michigan.gov/dnr/0,1607,7-153-10366-85266--,00.html](http://www.michigan.gov/dnr/0,1607,7-153-10366-85266--,00.html) "The Michigan Department of Natural Resources is committed to the conservation, protection, management, use and enjoyment of the State's natural resources for current and future generations."
- Michigan DNR "Relative Density of Deer" by Deer Management Unit: [www.michigan.gov/images/deer\\_density\\_85395\\_7.jpg](http://www.michigan.gov/images/deer_density_85395_7.jpg) (map)

*Note: These URLs worked at the time of publication.*

