

Economic Impact of Deer Overpopulation

Prepared

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Introduction

The overall objective of this study is to analyze the economic losses that result from deer overpopulation, including road traffic accidents; vegetation and landscaping; and tick-borne disease prevention and care, specifically Lyme disease. This work is designed to advance public policy initiatives with appropriate deer management strategies in Connecticut and is sponsored by the Fairfield County Municipal Deer Management Alliance (FCMDMA), in cooperation with the Connecticut Coalition to End Lyme Disease (CCELD) and Connecticut Audubon. This study was conducted by Drs. Peter Arno and Deborah Viola, health economists from New York Medical College School of Health Sciences and Practice.

This document is intended to accompany a brief Excel worksheet prepared to reflect estimated costs for each specific town in Fairfield County. The general categories of costs include: Environment/Landscape; Motor-vehicle; Tick Control and Tick Borne Disease. Expenditure and cost data reflect averages and are considered conservative estimates. As indicated on the spreadsheet, additional costs for each category may be considered based upon availability of local data. Further, categories not included in this analysis may also be considered, again, allowing for availability of data and information. Examples include *but are not limited to*: special education programs for children with Lyme disease complications; lost use fees from Nature Centers; loss of agricultural crops; loss of bird and wildflower species, or costs to towns for storm water damage and control from erosion due to loss of the understory.

Environment/Landscape

The average expenditures in this category for damages to single family households are comprised of four categories including: foundation or landscaping planting; vegetable gardens; deer fencing/netting; deer repellants (including sprays and tie-on bags). The cost and damage data are based in part on a comprehensive residential property survey conducted in Bernards Township, New Jersey in 2003.¹ We assumed an *average* deer density of 62 deer per square mile, which includes a two-fold correction factor over the observed number.² Data on single family households are based on the 2000 Census and can be adjusted in the accompanying spreadsheet as more recent data become available.

Motor Vehicle

The average expenditures for deer-related motor vehicle damage are based on the number of reported collisions (adjusted for under-reporting; correction factor, 8.6)³ multiplied by the cost per collision.⁴

Tick Control

The average expenditures for tick control, which includes personal body and clothing sprays and exterior landscape sprays, are based in part on the comprehensive residential property survey conducted in Bernards Township¹ and a study by Gould et al.⁵ The estimated expenditure includes: number of single family households X cost of tick control/household.

Tick Borne Disease

Our estimate for deer-related infectious disease is based exclusively on Lyme disease. Other tick-borne diseases were considered, however, insufficient data are available for reasonable estimates for these conditions. To compute the economic impact of Lyme we considered the number of reported cases,⁶ adjusted for under-reporting (correction factor: three-fold)⁷ multiplied by the cost per case. The cost per case is based on Zhang et al.,⁸ and is adjusted for inflation. The figure used in our analysis (average of \$10,652.74 per case) is based on the cost of treating Lyme disease as reported by Zhang from the CDC, as follows: “We calculated the following total costs of LD: 1) direct medical costs of LD diagnosis and treatment, 2) indirect medical costs, 3) nonmedical costs, and 4) productivity losses. Intangible costs (e.g., costs incurred because of pain and suffering) were not incorporated.”⁹ Further, these costs are an average cost of both early and late state stage cases of Lyme disease.

Economic Impact of Deer in Fairfield County, CT

	Environment/ Landscape	Motor Vehicle	Tick Control	Tick-Borne Disease	Total	Population	Single-Family Households	Cost Per Capita	Cost Per Single-Family Household
Bethel	\$1,783,025	\$383,450	\$800,189	\$768,997	\$3,543,661	18,005	4,435	\$187	\$799
Bridgport	\$2,757,158	\$26,230	\$1,856,188	\$607,208	\$5,246,778	141,814	13,718	\$37	\$383
Brookfield	\$3,793,802	\$157,380	\$638,487	\$543,280	\$5,132,759	16,469	4,718	\$312	\$1,088
Danbury	\$10,173,898	\$629,520	\$1,712,330	\$1,629,869	\$14,145,617	76,978	12,853	\$184	\$1,118
Darien	\$4,995,687	\$298,530	\$840,805	\$319,582	\$6,444,604	19,375	6,213	\$333	\$1,037
Easton	\$1,996,506	\$918,050	\$396,024	\$543,290	\$3,793,870	7,302	2,483	\$520	\$1,528
Fairfield	\$13,369,272	\$131,150	\$2,250,132	\$1,246,371	\$16,996,924	56,544	16,627	\$301	\$1,022
Greenwich	\$12,584,500	\$131,150	\$2,118,050	\$319,582	\$15,153,282	59,484	15,651	\$255	\$968
Monroe	\$4,612,146	\$52,460	\$776,253	\$980,705	\$6,431,583	19,210	5,736	\$335	\$1,121
New Canaan	\$4,292,930	\$655,750	\$722,527	\$511,332	\$6,182,538	18,998	5,339	\$325	\$1,158
New Fairfield	\$4,042,080	\$577,060	\$890,304	\$1,246,371	\$6,645,794	13,814	5,027	\$474	\$1,302
Newtown	\$6,212,245	\$445,910	\$1,045,580	\$1,981,410	\$9,685,124	26,011	7,726	\$372	\$1,254
Norwalk	\$6,701,923	\$157,380	\$2,255,951	\$928,788	\$10,042,043	81,844	16,670	\$123	\$602
Redding	\$2,367,986	\$1,101,660	\$398,547	\$607,208	\$4,476,399	9,144	2,945	\$489	\$1,520
Ridgefield	\$5,858,848	\$786,900	\$985,744	\$1,278,329	\$8,907,818	23,132	7,824	\$385	\$1,139
Shelton	\$3,970,096	\$393,450	\$1,336,384	\$1,374,203	\$7,074,133	38,593	9,875	\$183	\$716
Sherman	\$1,278,275	\$262,300	\$215,310	\$223,708	\$1,980,593	3,777	1,591	\$524	\$1,245
Stamford	\$7,645,500	\$183,610	\$2,573,571	\$982,872	\$11,265,552	118,067	19,017	\$95	\$592
Stratford	\$2,758,794	\$78,990	\$1,857,289	\$798,958	\$5,493,879	47,835	13,724	\$115	\$400
Thimble	\$8,823,080	\$681,980	\$1,484,978	\$830,914	\$11,820,930	35,047	10,873	\$337	\$1,077
Weston	\$2,784,494	\$28,230	\$468,848	\$287,624	\$3,568,998	9,799	3,463	\$384	\$1,030
Westport	\$7,039,633	\$262,300	\$1,184,814	\$447,415	\$8,934,162	25,104	8,755	\$356	\$1,020
Wilton	\$4,344,390	\$577,060	\$731,188	\$703,081	\$6,355,719	17,633	5,403	\$360	\$1,176
All Towns	\$124,184,993	\$8,916,200	\$27,069,248	\$19,047,099	\$179,219,540	883,577	200,584	\$203	\$894

Notes:

- 1) Environment/landscape damage is based on:
Number of single family households X Cost/hh (\$804.07)
(Notes: does not include cost to town of spraying fields, parties, farms or costs borne by Board of Education for fields; these may be added based on local data)
- 2) Motor vehicle damage Includes: Number of deer-related collisions X cost/case (\$30.60)
(Notes: does not include cost to town of deer carcass removal or ancillary police time associated with accidents; these may be added based on local data)
- 3) Tick Control Includes: Number of single family households X Cost of tick control/hh (\$135.33)
(Notes: does not include cost to households for pet tick repellents, Lyme vaccine and care; these may be added based on availability of local data)
- 4) Tick Borne (Lyme) Disease Treatment Costs Includes:
Adjusted number of reported Lyme cases, 2008 X treatment cost/case (\$10,652.74)
(Notes: does not include other tick-borne infections; these may be added based on availability of local data)

Additional categories may be added to this spread sheet based on availability of local data.

Please consult the narrative that accompanies this spreadsheet for a suggested list of additional categories.

References

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- ¹ Deer Damage Survey: Residential Property, Bernards Township, New Jersey, 2003.
- ² Connecticut Department of Environmental Protection, CT Wildlife, May/June 2009. Available at: http://www.ct.gov/dep/lib/dep/wildlife/pdf_files/outreach/connecticut_wildlife_magazine/cwmj09.pdf
- ³ For every one reported deer-related car collision, 8.6 are unreported. Personal communication, Howard Kilpatrick, Connecticut Department of Environmental Protection, May 6, 2010; Connecticut Department of Environmental Protection, Managing Urban Deer in CT, 2008. Available at: www.ct.gov/dep/lib/dep/wildlife/pdf_files/game/deersum08.pdf
- ⁴ Press release, State Farm, Deer-Vehicle Collision Frequency Jumps 18 Percent in Five Years, 9/28/09; Average cost per collision: \$3,050.
- ⁵ Gould HL, Nelson RS, Griffith KS, Hayes EB, Piesman J, Mead PS, Cartter ML, Knowledge, attitudes, and behaviors regarding Lyme disease prevention among Connecticut residents, 1999-2004. *Vector-Borne and Zoonotic Diseases*. 2008; 8(6):769-76.
- ⁶ Lyme disease cases and rates: Connecticut, 2008 rates per 100,000 population. Available at: http://www.ct.gov/dph/lib/dph/infectious_diseases/lyme/stats/ctldstats_2008.pdf
- ⁷ Naleway AL, Belongia AE, Kazmierczak JJ, Greenlee RT, Davis JP. Lyme disease incidence in Wisconsin: A comparison of state-reported rates and rates from a population-based cohort. *American Journal of Epidemiology*. 2002;155(12):1120-7.
- ⁸ Zhang X, Meltzer MI, Pena CA, Hopkins AB, Wroth L, Dix AD. Economic impact of Lyme disease. *Emerging Infectious Diseases*. 2006;12(4):653-660.
- ⁹ Zhang X, Meltzer MI, Pena CA, Hopkins AB, Wroth L, Dix AD. Economic impact of Lyme disease. *Emerging Infectious Diseases*. 2006;12(4):653-660.