

AN EVALUATION

New Jersey's 1998 Supplemental Deer Fence Program

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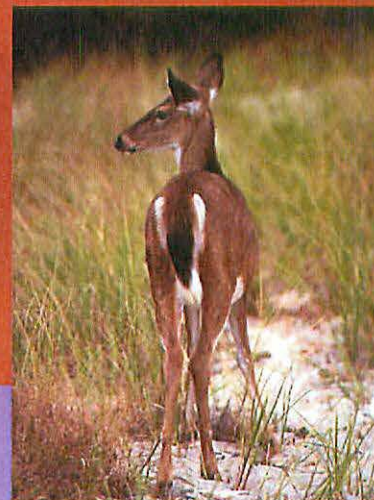
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In response to increasing conflicts between New Jersey's deer population and agricultural production, the New Jersey Department of Agriculture in 1998 appropriated \$300,000 to purchase high-tensile woven wire deer fencing. The appropriation was intended to enhance the New Jersey Division of Fish and Wildlife's existing deer fencing program. Approximately 5,150 rolls of 6-foot high-tensile woven wire fence were purchased, with each roll measuring 165 feet in length. High-tensile smooth wire fencing was also purchased. Two strands of the smooth wire were to be placed above the woven wire at one-foot intervals.

To be eligible for the supplemental deer fence program that was jointly administered by the New Jersey Department of Agriculture and New Jersey Division of Fish and Wildlife, farmers had to:

- 1) *have documented proof of a minimum of \$10,000 in annual sales of agricultural commodities produced on their New Jersey farm*
- 2) *have a federal identification number*
- 3) *be the owner of the land upon which the fencing would be erected*

A New Jersey farmer who was registered with the Division of Fish and Wildlife for deer fencing prior to December 1, 1997 was automatically eligible for the initial distribution in the jointly administered supplemental deer fence program regardless of the first two eligibility requirements.

If approved, an eligible farmer could receive up to 30 rolls (4,950 feet) of high-tensile woven wire fence and corresponding smooth wire. Installation of the fence was incumbent upon the farmer and had to be completed within 1 year of receipt of fencing material. The fencing could not be used for enclosure of equine, livestock, poultry, or other animals.

Since 1998, the Division of Fish and Wildlife has continued their fencing program to assist farmers in managing deer depredation. Although state funding to purchase fencing has been only a fraction of the \$300,000 appropriation, farmer demand for deer fence has increased. Prior to another large-scale appropriation to purchase additional deer fencing, it would be beneficial to evaluate the 1998 supplemental deer fence program in terms of farmers' overall satisfaction with the program and effectiveness of the installed fence in reducing deer damage to agriculture. Therefore, the objectives of our study were to:

- 1) *evaluate farmers' experience with and effectiveness of the 1998 supplemental deer fence program;*
- 2) *conduct on-site evaluations of installed fences.*

Methods

During 1998, 154 farmers received fencing through the supplemental deer fence program. We mailed surveys to 125 fence recipients. We intended to mail a survey to every farmer who received fencing but could not locate addresses for 29 recipients. We conducted 3 full mailings of the survey between July–August 2001, with a post card reminder between the first and second mailing. Seventy-nine (63%) surveys were returned, and 71 (57%) were usable. Twelve percent of the survey recipients indicated that they were unable to answer our survey because they had not installed their fence.

The mail survey inquired about recipients overall satisfaction with the supplemental deer fence program and details about the property where the fence was installed. Additional survey questions asked about the fence installation including cost, labor required, and fence construction, as well as the effectiveness of the installed fence.

To validate survey responses about fence installation, we visited 25 randomly selected fence recipients in northern New Jersey and 25 randomly selected fence recipients in southern New Jersey between July–August 2001. Upon visiting each of the 50 farms, we evaluated the installed fence based on physical characteristics and installation details.

Mail Survey Results

OVERALL SATISFACTION WITH THE SUPPLEMENTAL DEER FENCE PROGRAM

Overall, 86% of survey respondents were satisfied with the application and approval process in order to receive fencing, and 98% felt they had sufficient time to pick-up their fence allotment. At the time the fencing specifications were being defined, there was discussion about whether to order rolls of fencing that were 165 feet or 330 feet in length. Fencing rolls measuring 165 feet in length were ordered with the idea that the smaller rolls would be easier for farmers to handle. Fifty-nine percent of survey recipients preferred 165-foot rolls of fencing, while 41% of recipients would have preferred 330-foot rolls of fencing. Almost 92% of survey respondents heard about the supplemental deer fence program from their county extension offices, the New Jersey Department of Agriculture, New Jersey Division of Fish and Wildlife, or the New Jersey Farm Bureau.



Vegetable, fruit, and nursery crops were the most commonly grown crops within a fenced area.

PROPERTY CHARACTERISTICS

The majority of survey respondents (47%) used the fencing they received from the state to fence in more than 30 acres. However, 73% of respondents have additional fencing needs. If more fencing became available, respondents, on average, would like to fence an additional 112 acres. Survey recipients were asked to indicate all crops grown within the fenced area. Fifty-six percent of survey respondents grew vegetable crops inside the fenced area, 49% grew fruit crops, and 44% grew nursery crops. Only 4% of respondents experienced problems with local zoning ordinances or regulations when installing the fence.

FENCE INSTALLATION

An overwhelming majority of survey respondents (90%) installed the fence themselves, while 10% hired a professional fence contractor to install the fence. Of the respondents who self-installed their fence, 78% installed their fence according to fence manufacturer's guidelines, and 39% cited the Rutgers Cooperative Extension fact sheet titled "High-Tensile Woven Wire Fences for Reducing Wildlife Damage" as the most common source of installation information.

The average estimated installation cost for self-installed fences was \$446 per acre, compared to \$2,400 per acre for fences installed by a fence contractor. On average, it took 3 people a total of 154 hours to self-install a fence. Information on personnel hours was not available for contractor-installed fences.

Round, pressure-treated wood posts were the most commonly used corner post material in 52% of the self-installed fences and 100% of the contractor-installed fences. Round, pressure-treated wood posts were the most commonly used material for line posts in 54% of the self-installed fences and 100% of the contractor-installed fences. Fifty-two percent of self-installed fence corners were reinforced with horizontal braces (H-braces) and diagonal wire, compared to 100% of contractor-installed fence corners. Seventy-three percent of self-installed fence posts were augered into the ground (27% were driven), whereas 86% of contractor-installed fence posts were driven into the ground (14% were augered). The most common height of a self-installed fence was 6 1/2 feet, including 2 strands of high-tensile smooth wire, compared to 8 feet as the most common height of a contractor-installed fence, including 3 strands of high-tensile smooth wire. Regardless of self-installed or contractor-installed fences, 96% of survey respondents were satisfied with the overall quality of the fencing installation.

Seventy-three percent of survey respondents have additional fencing needs. If more fencing became available, respondents, on average, would like to fence an additional 112 acres.

"Farming in New Jersey has become impossible without the use of fence. The supplemental fence program helped me greatly."

— New Jersey Farmer

EFFECTIVENESS OF FENCING

Ninety-nine percent of survey respondents indicated that they experienced crop damage by white-tailed deer prior to installing the fence, with 66% of those respondents estimating annual crop losses exceeding \$5,000. After installing the fence, 96% of respondents stated that they experienced a reduction in crop damage, with only 4% of respondents estimating crop losses exceeding \$5,000. Forty-eight percent of respondents indicated that they experienced no deer damage once the fence was installed.

FENCE MAINTENANCE

Forty-seven percent of respondents who installed the fence themselves indicated that the annual fence maintenance was as expected or less than expected, whereas 57% of respondents whose fences were installed by contractors required an anticipated level or less than anticipated

level of annual maintenance. In both self- and contractor-installed fence situations, the high-tensile woven wire mesh required the most amount of maintenance. Herbicide was cited as the most common method (78%) to keep the fence free of vegetation.

FUTURE FENCING PRIORITIES

We asked survey respondents to rank how any future money should be used to assist farmers with fencing needs. Sixty-eight percent of respondents ranked additional funding for fence material as the highest priority. The second highest priority for additional state funding was for the purchase of fence posts, followed by subsidizing installation costs, and last, using state funding to rent equipment (i.e., post-drivers) to assist in self-installation of fencing.

On-Site Fence Survey Results

We made on-site visits to 50 randomly selected farms located throughout New Jersey to validate the mail survey results related to fence installation. Eighty-six percent of the farms we visited self-installed their deer fence compared to 14% who hired fencing contractors to install their fence. However, only 9% of the self-installations were considered comparable to contractor-installed quality.

After installing the fence, 96% of respondents stated that they experienced a reduction in crop damage... Forty-eight percent of respondents indicated that they experienced no deer damage once the fence was installed.

We examined a number of areas of each fence visited to determine if a self-installed fence was of contractor-installed quality. We evaluated corner posts for material used, whether corner posts were leaning in or pulling out of the ground, and the presence of bracing and wire reinforcement. We also examined line posts and the overall fence to determine if they were out of plumb. In addition, we looked for any sag in the fence, how fences were installed at stream and ditch crossings, and whether gaps existed between the bottom of the fence and the ground.

Corner posts are arguably the most vital part of a high-tensile woven wire fence since they carry a majority of the load exerted by a properly installed fence. Round corner posts are preferred since the pull from the high-tensile woven wire is more evenly distributed over the surface area of a cylindrical post compared to a non-cylindrical post. Only 38% of the self-installed fences used round corner posts. Furthermore, 36% of the surveyed corner posts were leaning inward and 22% were lifting out of the ground. A corner post that is leaning in or lifting out compromises the integrity of the entire fence and results in a fence that sags or leans. In other words, it is easier for deer to enter the fenced area.

Corner posts should be properly reinforced with horizontal braces (H-braces) at least twice as long in length as the fence is tall and with diagonal wire. Less than half (46%) of the fences we surveyed used H-braces for corner post reinforcement. Of those using H-braces, 17% were less than twice the height of the fence. Eighty-three percent of the fences we visited used diagonal wire for corner post reinforcement, but more than a quarter of the farmers (26%) used soft wire instead of hard wire. Soft wire stretches over time and may not provide adequate corner post reinforcement, which may compromise the integrity of the fence.

Line posts should be installed straight and equally spaced between corner posts to help support the fence. More than a quarter (26%) of the line posts we evaluated were not installed straight. Moreover, 24% of the fences we surveyed were not plumb, 34% of the fences sagged, and 84% of the fences were not properly installed at ditch and stream crossings. Deer may breach leaning and sagging fences, as well as walk into improperly fenced areas where ditches and streams access property. Sixteen percent of fences we examined had gaps between the bottom of the fence and the ground. The average gap between the fence bottom and the ground was 10 1/2 inches, more than enough room for a deer to crawl under the fence.



Properly installed high-tensile woven wire fencing is highly effective in reducing and eliminating deer depredation to agricultural crops.

DISCUSSION

Properly installed high-tensile woven wire fencing is highly effective in reducing and eliminating deer depredation to agricultural crops. Although hunting is the most efficient, cost-effective deer management tool in general, fencing may be a more feasible deer management option than hunting due to safety concerns in areas with high human density, time limitations, and anti-hunting sentiment, among other factors. One of the biggest drawbacks to high-tensile woven wire fencing, however, is the relatively large front-loaded cost to purchase and install the fence. State subsidized fencing programs like the 1998 supplemental deer fence program are a way to make fencing more affordable for farmers experiencing economic loss from deer depredation.



Deer fencing provides a politically acceptable management option in New Jersey, where diverse public opinions exist regarding deer management.

Our results suggest that the 1998 New Jersey supplemental deer fence program was very successful in terms of farmer satisfaction with the overall program, and ultimately, providing an effective option for reducing deer damage and subsequent economic loss to agricultural crops. Ninety-nine percent of mail survey respondents experienced deer damage prior to installing a deer fence, and 66% of those respondents estimated annual crop losses of \$5,000 or greater. Once a deer fence was installed, 96% of survey respondents indicated a reduction in deer damage inside the fenced area, with only 4% estimating deer damage inside fenced areas exceeding \$5,000. Furthermore, 48% indicated that they experienced zero deer damage once the fence was installed.

About 90% of survey respondents installed the deer fence themselves at an average cost of \$446 per acre, compared to an average cost of \$2,400 per acre as reported by the 10% of respondents who hired a fencing contractor to install their fence. However, we discovered upon conducting on-site evaluations that only 9% of the self-installed fences were of contractor-installed quality. The cost savings from self-installing a deer fence may not be as dramatic as they first appear when considering the fact that the lifespan and effectiveness of an improperly installed fence may be reduced, and maintenance costs increased, when compared to a properly installed fence. Regardless of who installed the fence, 96% of survey respondents were satisfied with the overall quality of their fence installation.

Demand for more deer fencing remains high. Seventy-three percent of survey respondents have additional fencing needs and indicated that, on average, they would like to fence another 112 acres if the state provided fencing. When asked to prioritize how future money should be spent, 68% of respondents suggested purchasing additional fencing, 22% stated that fence posts should be purchased, 9% indicated that installation costs should be subsidized, and 1% requested money be spent to rent equipment (i.e., post drivers) for installing fences.

RECOMMENDATIONS

- 1) *Cost-sharing funds should be made available to assist farmers in off-setting the cost of high-tensile woven wire deer fence.*

For many farmers in areas with high deer densities, fencing is becoming a necessary part of staying in business. Fencing is the only deer management option that can be 100% effective in eliminating deer depredation to agricultural crops. Furthermore, deer fencing provides a politically acceptable option in a state with diverse public opinions regarding deer management. However, the relatively high cost of purchasing and installing fencing is an additional expense that makes staying in the farming business more difficult. An annually subsidized fencing program can help farmers continue farming in areas with high deer densities, ensuring that New Jersey's long agrarian history continues.

- 2) *Establish a farmer cooperative to purchase fence posts and materials in large quantities at a discounted price.*

Fence posts represent a large material cost when purchasing a high-tensile woven wire fence. Other materials like fence staples and gates add to the cost. The agency(s) responsible for administering future supplemental deer fence programs should organize farmers interested in installing a high-tensile woven wire fence as a cooperative for the purpose of purchasing fence posts and fencing materials. Collectively, each farmer would be able to purchase posts and materials at a cheaper price than if they bought posts and materials as an individual.

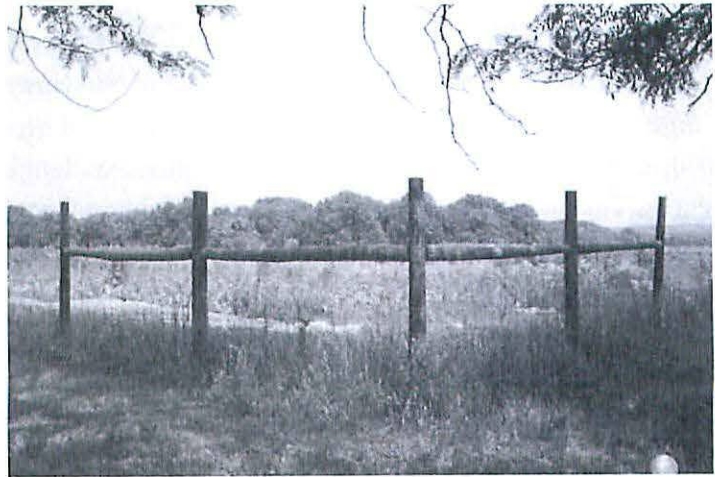
- 3) *Provide low-interest loans to make the front-loaded costs of installing a high-tensile woven wire fence affordable to as many farmers as possible and to improve installation quality.*

Twelve percent of farmers we surveyed had not installed the fence they received under the 1998 supplemental deer fence program even though they were required to install it within 1 year of receiving the fence. Most of these farmers indicated they could not afford to install the fence, but they did not want to miss an opportunity to receive free fencing if installation became affordable at a later date. In addition, a self-installed fence can represent a tremendous cost savings over a contractor-installed fence, but only 9% of the self-installed fences were of contractor-installed quality. Many of the sub-standard installations were a result of farmers not able to afford the extra materials required to properly install the fence. Sub-standard installations reduce the life span of the fence, increase maintenance costs, and ultimately, provide less protection from deer depredation. Low-interest loans provided via the Small Business Administration, New Jersey Department of Agriculture, or a grant, for example, would provide farmers the money necessary to properly install a fence, thereby maximizing the life span and benefits of a high-tensile woven wire fence.

- 4) *Farmers who intend to install fencing themselves should be required to attend a fence-installation workshop.*

Future supplemental deer fence programs should require that farmers intending to self-install their fence attend a brief fence installation workshop to fully understand how to properly install a high-tensile woven wire fence. A fence installation workshop can help farmers circumvent common mistakes, save them time and money, and improve the installation, life span, and benefits of a deer fence.

Rutgers Cooperative Extension should cooperate in any education effort.



A state subsidized deer fence program would help keep New Jersey agriculture viable.

- 5) *A monitoring system should be implemented to ensure fence installation is completed in a timely fashion.*

Under the 1998 supplemental deer fence program, fence installation had to be completed within 1 year of receipt of the fencing material. However, our survey results indicated that 12% of fence recipients had yet to install their fence. Although most of these farmers indicated they could not afford to install the fence, the demand for fencing is too great for fence material to go unused. Therefore, a monitoring system should be implemented to ensure fencing installations are completed within the required time period. If fencing installations are not completed within the required time period, fence recipients may need to relinquish their fencing allotment if demand for fencing from other farmers exists.