

**IMMUNOCONTRACEPTION OF WHITE-TAILED DEER AT
FIRE ISLAND NATIONAL SEASHORE**

2001 Progress Report to Fire Island National Seashore
And
The New York State Department of Environmental Conservation

Submitted by
The Humane Society of the United States
700 Professional Drive
Gaithersburg, MD 20879

January 14, 2002

Prepared by Rick Naugle
Research Associate
Wildlife and Habitat Protection
The Humane Society of the United States,

Allen Rutberg, Ph.D.
Senior Scientist
Wildlife and Habitat Protection
The Humane Society of the United States

And

Ernest Taylor
Wildlife Biologist
Fire Island National Seashore

NYSDEC License Number LCP00-549
NPS Special Use Permit Number FIIS-2001-SCI-0005

I. INTRODUCTION

The first phase (1993-1997) of the Fire Island National Seashore (FIIS) deer immunocontraception project, which began in autumn 1993, was intended to test whether the PZP immunocontraception vaccine could be delivered effectively to deer in the field, and whether vaccine efficacy under field conditions matched that in more controlled situations. This study confirmed that PZP vaccine could be delivered to large numbers of free-ranging, mostly habituated deer, but vaccine efficacy was lower than that seen in more controlled studies, especially the year following initial treatment. However, vaccine efficacy increased with successive annual booster treatments. In addition, the use of monitors to identify and attract individual deer for treatment was extremely labor intensive (Kirkpatrick et al. 1997; Naugle et al. *in press*, attached).

The Humane Society of the United States (HSUS) began the second phase (1998-2002) of the project, in cooperation with FIIS, the National Park Service (NPS), and the Biological Resources Division of the U. S. Geological Survey/ Patuxent Wildlife Research Center at the State University of New York (BRD/SUNY), in autumn 1998. The principal goal of this phase of the project is to determine whether the PZP vaccine can be useful at Fire Island as a deer management tool within the communities. Specific objectives include the demonstration of a reduction in the deer population in the communities; the scaling back and eventual elimination of the labor intensive deer monitoring system; the use of distance sampling methods to estimate population density and composition; reduction of the total amount of bait and bait stations used to attract deer for darting; shortening of the time that bait is available; and the relocation of bait stations outside the communities to the extent consistent with effective and efficient vaccine delivery. The immunocontraception project is closely linked to FIIS's goal of curtailing the feeding of deer and reducing the overall impacts of deer in the communities.

II METHODS

Darting and PZP Treatments. Female white-tailed deer were treated with 65 µg PZP emulsified in 0.6 cc of Montanide® ISA 50 adjuvant (Seppic, Inc.). All does treated were presumably at least one year old and had been treated in previous years with PZP and either Freund's Complete Adjuvant (FCA) or Freund's Incomplete Adjuvant (FIA). Of the 208 does treated, 193 were unidentified and 15 identified.

Of the 208 PZP treatments on FIIS during 2001, 180 were delivered in combination 1cc/3cc vaccination/marketing darts with barbless 2.5 cm needles (Pneu-Dart®, Williamsport, PA) fired from either a Dan-Inject® CO₂ injection pistol (n=178) or a Pneu-Dart® .22 cartridge-powered capture rifle (n=2). The remaining 28 treatments were delivered -- to many of the identified does, a few highly recognizable unidentified does, and in several instances to extremely wary does -- in 1cc barbless darts fired from a Dan-Inject® CO₂ injection pistol (n=23) or a Pneu-Dart® .22 cartridge-powered capture rifle (n=5). All vaccine was delivered in the hip or gluteal region of the deer. The marking substance used this year was non-toxic Sharpmark® red liquid livestock marker concentrate (Nasco, Fort Atkinson, WI).

Darting Locations. During the 2001 darting period does were treated at bait stations and along community streets in the areas of: (1) a seven contiguous community region which includes Kismet, Seabay Beach, Saltaire, Fair Harbor, Dunewood, Lonelyville, and Atlantique Beach, (hereafter collectively referred to as the West End Communities); (2) Robbins Rest and Atlantique, and a six contiguous community region, which includes Corneille Estates, Ocean Beach, Seaview, Ocean Bay Park, Point O' Woods, and Oakleyville (hereafter collectively referred to as the Mid-Island Communities); (3) Cherry Grove and Fire Island Pines (hereafter collectively referred to as the East End Communities); (4) NPS lands between the Fire Island Lighthouse and Kismet (hereafter collectively referred to as West End NPS land); (5) NPS lands between Atlantique Beach and Corneille Estates (hereafter collectively referred to as Mid-Island NPS land); and (6) between Point O' Woods and Cherry Grove, between Cherry Grove and Fire Island Pines and the Talisman Heliport area (hereafter collectively referred to as East End NPS land) (Table 1).

Bait Stations. Deer were darted at seven bait stations located in monitors/residents yards, eight on FIIS/NPS lands and three on community-owned lands. At six of the FIIS/NPS bait station sites automatic feeders, designed to dispense bait at preset times, were used to attract deer for darting. Baiting started approximately three-weeks prior (August 15) to the start of the darting period and continued at most stations through September 20.

III. RESULTS

Logistics and Cost. Between 6 September and 19 September 2001, four darters spent 14 days in the field darting a total of 208 female white-tailed deer. Deer were treated by personnel from The HSUS and FIIS/NPS with the volunteered assistance of several Fire Island deer monitors and residents. Deer were darted at 18 bait stations, including 11 FIIS/HSUS-run bait stations and seven monitor/resident-run bait stations, in 17 communities and on NPS lands between the FIIS lighthouse and the Talisman Heliport. Approximately 281 person hours were spent delivering the 208 treatments, averaging 20.1 person hours/day, 14.9 deer treatments/day, and 1.35 person-hours/treatment. Deer were also darted along community streets and on NPS lands as they were encountered. Approximately \$11070 was spent on vaccine (\$4680), bait (\$1582), a rental vehicle (\$1070), darting supplies (\$1943), and miscellaneous expenses (\$1795), at a cost of approximately \$53 per deer treatment (not including personnel costs).

In addition to manpower, FIIS provided a four-wheel drive vehicle and The HSUS provided three bicycles. Corn for the bait stations was paid for by The HSUS and distributed to bait stations primarily by FIIS. Several of the Fire Island community residents again provided us with areas for bait stations and storage in addition to ones provided by FIIS. The community of Saltaire and a Fire Island Pines resident provided housing for The HSUS personnel during the period.

Safety and Darting Efficiency. None of the 208 deer darted was injured during the darting period and all but six darts discharged were recovered and tested for complete injection. Two vaccination/markings darts stuck in deer's hips (at Station A, Seabay Pool house, and at Station 2, Kismet Firehouse) and were not recovered after the deer disappeared into heavy cover. Both

deer were observed a few minutes after the incidents occurred and neither showed any signs of injury. In addition, four vaccination/marketing darts were lost in dense cover after missing their intended targets (at Station 2, Station 3, Station 6, and the wooded area between Oakleyville and the Sunken Forest). There were 11 complete misses with vaccination/marketing darts and two complete misses with 1cc darts. Two vaccines were known to be lost due to defective vaccination/marketing darts and 10 vaccines were discarded after being mixed and carried in darts for periods of two days or longer. In addition, one vaccine was lost during mixing and loading a dart. In summary, a total of 234 vaccines were dispensed during fall 2001.

Of the 208 deer darted on Fire Island in 2001, approximately one-half (51%) were darted at bait stations and the remaining one-half (49%) were darted along community streets or in a few instances in semi-remote areas such as the Sunken Forest and Sailors Haven. While many of the deer darted along community streets may have eventually been darted at bait stations there were several deer darted along community streets that were often observed at bait stations, but failed to get darted there because of their wariness. Between the shyness of some deer to enter and then linger at bait stations and the relatively small size and confinement of a few bait stations, it was often easier to roam streets around the bait stations and dart deer as they were encountered in more open areas.

Marking dyes. In 2001, less than 10 percent of the does encountered were still in their summer coats or in transition. As a result, the Sharpmark red marking dye remained visible on deer's coats for times ranging from less than one day to over 15 days, depending on whether deer licked the site of injection and whether they were in a full summer coat or in transition from summer to winter coat. However, during the process of baiting and darting deer each day, close observations made by darters revealed that once a deer had been marked, regardless of whether it licked the injection site or not, it usually retained some trace of the red dye for at least several days. Darting was usually concluded in an area when the majority of the female deer encountered showed signs, however faint, of the red dye on their coats. Between the daily observations made by the darters and observations made by several deer monitors in several communities, we estimate that we darted over 95 percent of the observable female deer in nearly every community we worked in. However, because of the limited effectiveness of the Sharpmark marking dye during the past three years The HSUS will continue searching for a non-toxic marking dye that will reliably persist on a deer's coats for longer periods of time.

Population Monitoring. Results of population monitoring will be reported in detail elsewhere by Dr. Brian Underwood and his colleagues. To summarize, however, distance sampling techniques indicate that deer population density in the West End communities increased by approximately 11% per year between 1995 and March 1998, then decreased at approximately 23% per year through October 2000. In 1999-2000 fawn surveys, fawns comprised 13-14% of the total population in the West End communities, where treatments have been carried out the longest, 11%-23% in the communities and NPS lands with shorter treatment histories, and 16-33% at Robert Moses State Park and Davis Park, where treatments have not taken place. (See Naugle et al. *in press*, attached; analysis of 2001 results are still pending)

IV. DISCUSSION AND CONCLUSIONS

There were three important factors that came to light during the fall 2001 darting period. First, bait usage continued to decrease in 2001 (12,000 pounds used in 2001 vs. 14,000 pounds in 2000 and 21,450 pounds in 1999), due to limited use of automatic feeders and a significant decrease from previous years usage in the amount of bait placed out daily at several bait stations on FIIS/NPS lands. Baiting began on 15 August again this year and in most cases was discontinued at bait stations once darting was completed in a group of communities. Second, darting deer primarily at bait stations in the mornings and an increase in the amount of time spent roaming community streets in the late afternoon and evenings drastically increased our ability to locate deer in a short amount of time and dart several deer that seldom visited bait stations or were hesitant to enter bait stations when darters were present. Third, four people darting deer at the same time in each of the three community groups and on FIIS/NPS lands allowed us to dart the majority of deer in each section in a relatively short amount of time (approximately 5 days/community group described in Table 1) and before dye marks wore off. It should also be noted that the four darters were in constant communication with one another and by doing so were able to cover nearly every area between the Fire Island Lighthouse and the Talisman Heliport.

The total number of PZP vaccine treatments delivered in 2001 again decreased slightly over the number delivered in 1999 and 2000. However, daily surveys conducted by darters and deer monitors indicated that well over 95% of the observable does in the communities between Kismet and Fire Island Pines received treatments and over 95% of the observable does on FIIS/NPS lands between the Fire Island Lighthouse and the Talisman Heliport received treatments. It is possible that the reduced number of dartings is due in part to diminished monitoring effort and darters' failure to locate all of the deer. However, distance-sampling data collected by BRD/SUNY, plus observations by many long-term deer monitors, the majority of year round residents, FIIS personnel, and The HSUS that fewer deer are seen at bait stations and along community streets in every community between Kismet and Fire Island Pines, all suggest that the number of deer in the treatment areas is declining.

LITERATURE CITED

- Kirkpatrick, J. F., Turner, J. W. Jr., Liu, I. K. M., Fayrer-Hosken, R. A., and Rutberg, A. T. 1997. Case studies in wildlife immunocontraception: wild and feral equids and white-tailed deer. *Reproduction, Fertility, and Development* 9:105-110.
- Naugle, R. E., Rutberg, A. T., Underwood, H. B., Turner, J. W. Jr., and Liu, I. K. M. *in press*. Field testing immunocontraception on white-tailed deer (*Odocoileus virginianus*) on Fire Island National Seashore, New York, USA. *Reproduction Suppl.* 60.

Table 1. PZP treatment locations and number of deer darted on FIIS during fall 2001

	West End Community	Mid- Island Community	East End Community	West End NPS Land	Mid-Island NPS Land	East End NPS Land	Total
FIIS/ Community Bait Stations	43 (61%)	12 (15%)	0	6 (50%)	2 (100%)	10 (77%)	73 (35%)
Monitor/ Resident Bait Stations	14 (20%)	14 (17%)	6 (20%)	n/a	n/a	n/a	34 (16%)
Roaming Streets	13 (19%)	55 (68%)	24 (80%)	6 (50%)	0	3 (23%)	101 (49%)
Total	70	81	30	12	2	13	208