

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

1998 Progress Report to the
New York State Department of Environmental Conservation

Submitted by
The Humane Society of the United States
2100 L St. N.W.
Washington, DC 20037

January 27, 1999

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NYSDEC License # LCP98-581
NPS Special Use Permit # NER-FIIS-9500-017

I. INTRODUCTION

The first phase 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 condition matched that under 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 (see Appendix I). In addition, the use of monitors to identify and attract individual deer for treatment was extremely labor intensive. A manuscript describing the results of this first phase is in preparation, with submission for publication planned for spring 1999.

We began the second phase of project, in cooperation with the National Park Service (NPS) and the Biological Resources Division of the U.S. Geological Survey (BRD/USGS), 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 (see Appendix II); reduction of the total amount of bait 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 the Seashore's goals of curtailing the feeding of deer and reducing the overall impacts of deer in the communities.

II. LOGISTICS AND COST

Between 1 September and 27 September, 1998, the sixth annual darting phase of the Fire Island deer immunocontraception project was carried out. Deer were treated by Rick Naugle of the Humane Society of the United States (HSUS) and Robert Jennings of the Morris County, New Jersey, Park Commission with the assistance of several Fire Island deer monitors and residents. Deer were darted at 15-different long standing and temporary bait stations in or near 14 communities, at two automatic feeders temporarily set up on NPS land, and along community streets as they were encountered. Two darters, using marker darts almost exclusively (see VI. below), spent a combined 36 days delivering a total of 246 PZP treatments to approximately 200 white-tailed does, averaging 6.8 treatments/day. Approximately 189 person hours were spent delivering the 246 treatments, averaging 5.3 hours/day, or 0.77 hours/treatment. Approximately \$12,500 was spent on vaccine, bait, darting supplies, etc. at a cost of approximately \$51 per deer treatment (not including personnel costs).

FIIS provided a rental sport utility vehicle and a small four-wheel utility vehicle. In addition, FIIS provided assistance in distributing bait station supplies and moving personnel up and down the island. Corn for bait stations was paid for and distributed to all communities during the darting period by The HSUS. All communities again provided money for purchasing bait and conducting fieldwork in addition to providing us with bait stations or sites to dart deer. The Incorporated Village of Saltaire and the deer monitor in Fire Island Pines provided housing during our stay.

III. DARTING AND PZP TREATMENTS FOR 1998

During the treatment period, 46 unidentified does assumed not to have been treated in the past were temporarily marked and treated with a 65 µg dose of PZP vaccine emulsified in 0.5 cc of Freund's Complete Adjuvant (FCA) and 142 unidentified does assumed to have been treated in the past were temporarily marked and treated with a 65 µg dose of PZP vaccine emulsified in 0.5 cc of Freund's Incomplete Adjuvant (FIA). Nineteen of the 46 unidentified does were believed to be yearling does based on their body size and the remaining 27 does were assumed to be adults based on body size. Yearling does were treated in all communities (including 4 in the new communities) and all of the 27 adult does assumed to be new to the project were treated in communities and NPS lands where we have never darted deer before. Approximately 10 to 20 days after treatments with PZP and FCA, 31 of the 46 new does were presumptively relocated and given booster treatments of PZP in FIA. An additional 27 treatments were given to 24 identified does in two communities where monitors continue to monitor deer and collect fawning data (Table 1).

Table 1. PZP treatments on FINS during fall 1998

	Identified Does Treated w/ FCA	Unidentified Does Treated w/ FCA	Identified Does Treated w/ FIA	Unidentified Does Treated w/ FIA
Yearlings	2	19		14
Adults		27	25	159
Total	2	46	25	173

IV. DARTING LOCATIONS

Does were treated this year in the areas of: (1) a six contiguous community region which includes Kismet, Saltaire, Fair Harbor, Dunewood, Lonelyville, and Atlantique Beach (hereafter collectively referred to as the West End); (2) the NPS land east and west of Robbins Rest, Robbins Rest, and a five contiguous community region, which includes Corneille Estates, Ocean Beach, Seaview, Ocean Bay Park, and Point O' Woods (hereafter collectively referred to as the Mid-Island Communities); and (3) Cherry Grove and Fire Island Pines (hereafter collectively referred to as the East End Communities) (Table 2).

Table 2. PZP treatment locations on FINS during fall 1998

	West End Communities	Mid-Island Communities	East End Communities	NPS Land	Total
Identified Does	0	2	27	0	29
Unidentified Does	113	88	10	6	217
Total	113	90	37	6	246

V. BAIT STATIONS

Deer were darted at 15 community and monitor-run bait stations and two automatic feeders. A total of 8,000 lbs of corn was provided to deer over the four weeks during which baiting occurred.

The automatic feeders, designed to dispense bait at preset times, were set up and tested on two stretches of NPS land. One feeder was set up on NPS land near the FIIS lighthouse/checkpoint (approximately 1 kilometer from the Kismet firehouse bait station) on 3 September and was set to daily discharge approximately 1.5 kg of bait at 0700 (sunrise) and again at 1800. Over a three week period it was monitored a total of three hours at sunrise and a total of four hours after discharge of bait in the evening. These observations revealed that one doe, one yearling buck, and one fawn routinely visited the feeder when it discharged bait. In addition, although it was never observed, it appeared that one mature buck visited the feeder on two occasions after dark. On both occasions the three legged, 18+ kg feeder, standing three meters high, and containing approximately 65 kg corn inside was upset, damaged, and moved approximately 1.5 meters from its original position. A second automatic feeder was set up on NPS land between Atlantique and Robbins Rest (communities in which we have never darted deer) on 12 September and was set to daily discharge approximately 1.5 kg of bait at 0700 (sunrise) and again at 1800. This station was monitored a total of two hours at sunrise and three hours in the evening and revealed an adult doe and two yearling does routinely visiting it primarily at sunrise. On one occasion a

small buck with an injured front leg was observed feeding at the site.

VI. METHODS OF TREATMENT

Of the 246 PZP treatments on FIIS during 1998, 229 were delivered in combination 1 cc vaccine/1 cc, 2 cc, or 3 cc marker, barbless Pneu-Dart® darts with 2.5 cm needles, fired from either a blowpipe, Dan-Inject® injection pistol, or a Pneu-Dart® capture rifle. The remaining 17 treatments were delivered in standard 1 cc barbless darts to several identified does, a few highly recognizable does, and in a few instances to extremely wary does. All does treated were at least one year old and all vaccine was delivered in the hip or gluteal region of the deer. The marking substance used this year was non-toxic Sharpmark® liquid livestock marker concentrate.

No animals were injured during the darting period and all but three darts discharged were recovered and tested for complete injection. Two 1 cc/2 cc marking darts were lost at bait stations on NPS lands and one dart was lost in heavy vegetation in a resident's back yard after it stuck in a deer's hip and apparently failed to discharge. Twenty vaccines were lost due to defective 1 cc/ 2 cc marker darts and an additional ten 1 cc/2 cc marker darts malfunctioned and had to be discarded after the vaccine was removed and placed in a new dart. Two 1 cc/2 cc marker darts struck bone and both does were followed short distances until the darts fell out. One 1 cc dart fired from the capture gun blew apart on impact and it is presumed that the vaccine did not discharge into the animal. There were three complete misses with marker darts. Marking dyes remained visible on deers' coats for times ranging from less than one day to over 30 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. Over 50 percent of the does encountered in the fall of 1998 were still in summer coats or in transition.

VII. DISCUSSION AND CONCLUSIONS

There were several important accomplishments in autumn 1998. First, the use of the intensive volunteer efforts to monitor individual deer was ended, except for two individuals who wished to continue monitoring and will provide supplementary data. A number of volunteers continued to assist with setting out bait and monitoring bait stations during the darting period, but this represents a far lower investment in volunteer time. Baiting began later this year than in previous years, and at most baiting sites the amount of feed provided was tightly controlled, suggesting that a reduction in the amount of feed provided is occurring.

The automated bait stations were only modestly successful at attracting deer. Based on our experience, we believe that the portions of bait released at these stations were too small to attract significant numbers of deer. Although plans have not been finalized, we expect next year to repeat the use of these automated feeders but place multiple feeders at each site. These feeders would be timed to release bait synchronously, allowing multiple deer to visit and feed together at the bait sites.

The Sharpmark® marking dyes were only partly successful. Some difficulties could be addressed if vaccinations were timed so as not to occur during the autumn moult. Even so, the dye is not entirely satisfactory, and efforts will continue to identify a quick-setting, non-toxic marking dye that will reliably persist in the deer's coat for 4-8 weeks. New concerns also arose over the reliability of the Pneu-dart® marking darts. Failures of these darts — including erratic flight after firing, failure to inject, and explosions of one or the other chamber — occurred at an unacceptably high rate. The problems have been reported to the manufacturers; other delivery systems are also being explored.

Finally, the number of deer treated was lower this year than anticipated. Although we expanded darting activities to new locations in the Mid-Island communities and intervening NPS lands (adding about 31 deer to the program), the total number of treatments delivered this year increased by only 19 over 1997, and the estimated total number of deer treated actually declined slightly (from 210 to about 200). While it is possible that the reduced number of dartings is due in part to diminished monitoring effort, the darters believe the reduction in dartings may reflect a genuine decline in the number of deer frequenting the communities, or at least in their visibility. This perception that deer are less common is supported by anecdotal reports from community residents. However, conclusions about changes in deer densities in the Fire Island communities await analysis of data being collected by BRD/USGS.

VIII. ACKNOWLEDGMENTS

Thanks to everyone at Fire Island National Seashore and the NYSDEC for their assistance, advice, and support, and to Morris County Park Commission for providing the services of Rob Jennings. Thanks also to the communities and residents of Kismet, Saltaire, Fair Harbor, Dunewood, Lonelyville, Atlantique Beach, Atlantique, Robbins Rest, Corneille Estates, Ocean Beach, Seaview, Ocean Bay Park, Point O' Woods, Cherry Grove, and Fire Island Pines and especially the monitors and those people who provide their time and support in other ways for making this project the success it is.

Appendix I.

**Combined fawning rates among PZP-treated adult does at Fire Island National Seashore,
1993-1997**

Appendix II

Population census methods

Estimation of population density and herd composition at Fire Island National Seashore is being carried out under the direction of H. B. Underwood, BRD/USGS, using distance sampling methods described in detail in Underwood et al. 1998. Density sampling transects are currently being conducted in the West End Communities (Kismet-Lonelyville), the East End Communities (Fire Island Pines and Cherry Grove) and the Sunken Forest, Robert Moses State Park, the Lighthouse tract, and the community of Davis Park. For the purposes of this study, population densities in the west end and east end communities will be compared to population densities in Davis Park, which is a control site isolated by approximately 4 km from the nearest darting activity. Because of their close proximity to darting activities, population densities in the Sunken Forest and the Robert Moses/Lighthouse tract are likely to be affected by the immunocontraception program in ways that are interesting but not clearly predictable.

Sampling is being carried out quarterly, generally in the months of February, May, August, and November. The most intense sampling has been carried out in the west end communities, beginning in July 1995. Less intensive sampling has occurred in the Robert Moses/Lighthouse tract since 1996, in the east end communities/Sunken Forest since January 1997, and at Davis Park beginning in November 1998.

Reference

Underwood, H. B., F. D. Verret, and J. P. Fischer. 1998. Density and herd composition of white-tailed deer on Fire Island National Seashore. Final Report to the National Park Service. 42 pp. + 4 Tables, 14 Figures, 2 Appendices.