Head of the Harbor Deer Immunocontraception Project:
General Overview & Timeline

Study Title: Developing techniques to reduce animal handling in deer immunocontraception programs

Researchers:

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Project Partners:

Avalon Park and Preserve
The Village of Head of the Harbor

Project Goals

This five-year study is primarily intended to test technologies that will improve cost-effectiveness and practicality of PZP contraceptives for management of suburban deer. Specifically, we will:

1) Test remote delivery of initial doses of controlled-release PZP vaccines ("PZP-22"). Although initial doses of PZP-22 delivered by dart have been shown to be effective in wild horses, in deer initial PZP-22 shots have only been administered by hand.
2) Test individual identification systems that don't rely on capturing and ear-tagging. Although all study animals will be ear-tagged, the implantable microchips and Artificial Intelligence (AI) individual recognition systems that we will test could ultimately reduce the need to capture all deer prior to treatment. Capturing deer for ear-tagging is more time-consuming, costlier, and riskier to animals and field personnel than direct administration of vaccine by dart, and requires higher levels of personnel training, expertise, permitting, and personal commitment.
3) Test and cross-check a variety of population estimation techniques, including drone surveillance, distance sampling, mark-resight, and AI-based identification of deer in camera trap grids.
4) Contingent on successful outcomes in accomplishing goals 1 and 2, develop and test tools to deliver PZP-22 and PIT tags remotely in a single package.

Study Design

Over the course of the study, up to 90 adult female deer will be captured via chemical immobilization and marked with individually numbered ear tags. In general, each deer will be darted once for capture, and then up to two more times total for direct dart administration of the PIT tag and/or PZP.

Timeline for Year 1 field efforts: (2019)

Early Winter:

- The research team will begin obtaining data for deer population estimates via drone surveys and camera trapping over the course of 4 to 6 weeks.
- Tag readers and automatic bait stations will be erected on designated and authorized properties along with appropriate identification and warning signs- **residents should avoid approaching or tampering with such equipment.**

March & April 2019:

- The research team will be actively capturing, tagging, treating, and monitoring deer in the village. This work will be carried out by trained and experienced professionals at all times and should not heavily impact resident routines.
- Capture and animal handling will take place during both dark and daylight hours. All members of the research team will be working from clearly marked vehicles.
- To help us get better access to the deer, the research team will ask residents for written permission to access their properties for darting deer. Some residents may also be asked for permission to place trail cameras on their property to help us monitor deer numbers and movements.
- Darting *will not occur* during times or at locations of heavy human and/or non-target animal activity.
- Darting *will not occur* on any properties where permission to work has not been granted.

Summer:

- The research team will continue monitoring and observing pregnancy and fawning of treated and un-treated does within the village. Residents may see research team members observing and recording deer behavior during both dark and daylight hours.

Fall:

- The research team will continue monitoring and observing pregnancy and fawning of treated and un-treated does within the village.
- Residents may see research team members observing and recording deer behavior during both dark and daylight hours.
- Additional population surveys including drone and camera trapping will be carried out over the course of 4 to 6 weeks in the Autumn season.

A formal work plan outlining the field team objectives and schedule will be submitted to The Village prior to each darting session or during times where increased project personnel are present (i.e. Summer and Fall observation sessions)

Residents are encouraged to contact the research team via Avalon Park & Preserve throughout the year to provide their own observations or receive additional information as requested.

All field work and reporting will be carried as authorized by Scientific License to Collect or Possess (LCPSCI) # 2474 issued by the New York State Department of Environmental Conservation.

Tufts UNIVERSITY

CUMMINGS SCHOOL OF
VETERINARY MEDICINE

Center for Animals and Public Policy

PZP Immunocontraception for Deer
Dr. Allen Rutberg

How PZP Immunocontraception Works
Immunocontraceptive vaccines activate the immune system to block a crucial aspect of reproduction. When administered to a female deer, the porcine zona pellucida (PZP) vaccine causes her to produce antibodies that bind to the protein envelope surrounding the egg, blocking fertilization.

History of PZP Field Research
PZP was first recognized as an effective contraceptive in the 1970's. Since we first began treating deer on Fire Island, New York, in 1993, more than 2000 deer have been treated at field sites in seven states. PZP is also widely used in wild horses, African elephants, and about 100 species of animals in zoos.

Effectiveness and Longevity
PZP comes in two forms. "Native PZP" must be administered annually, typically in autumn, to maintain effectiveness. "PZP-22" (so-called after early tests suggested 22 months of effectiveness) yields two or more years of contraception after a single winter treatment. Treatment of white-tailed deer with PZP typically reduces pregnancy rates by 80-90%. PZP can be administered directly by dart, or by first capturing deer and hand-injecting them.

Side Effects and Safety
PZP is a naturally occurring protein that must be injected to be effective. If eaten, PZP is digested like any other protein. In deer, the only known side effect of PZP treatment is extension of the mating season. Current evidence indicates that this mating season extension does not increase the risk of deer vehicle collisions, or cause any harm to the deer themselves

Population Control
Suburban deer populations have been stabilized and modestly reduced (20-50%) at three field sites. Typically, population stabilization is rapid, but population reduction is gradual (5-10% per year). Although high rates of female immigration could overwhelm efforts to control populations, multiple studies have shown that 90% of female deer in suburbs stay close to their birthplace throughout their lives. Population effects of contraception are site-specific.

Cost and Effort
Costs and effort vary from site to site, and depend mostly on how much time it takes to administer PZP to deer, and whether the deer need to be captured for identification or other purposes. For example, at Fripp Island, SC, where deer were *relatively* easy to approach, deer were captured, ear-tagged and treated with PZP-22 at a cost of ~$500/deer. Dart-delivered native PZP treatments, which did not involve capture, cost ~$100/deer.

Regulatory Status
Use of PZP on deer must be approved by the state wildlife agency. At the federal level, the EPA regulates wildlife contraceptives, and native PZP is registered with EPA for use on deer under the trade name "ZonaStat-D."

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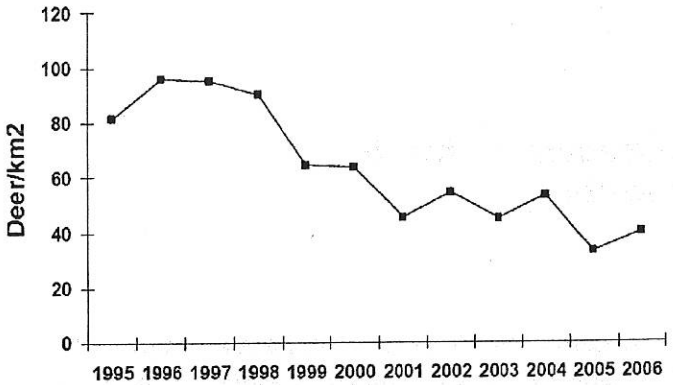
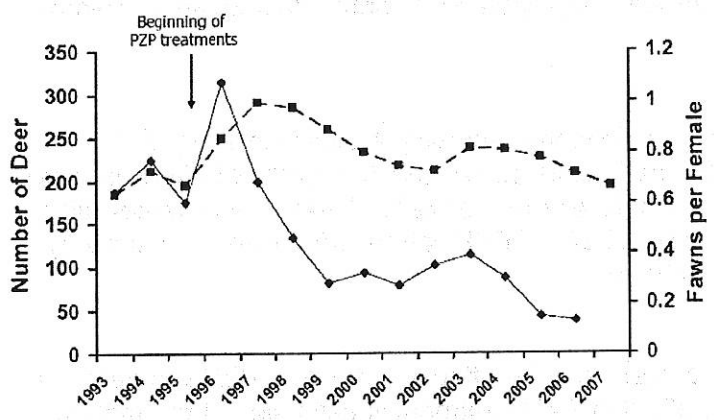
Fire Island National Seashore, 1995-2006



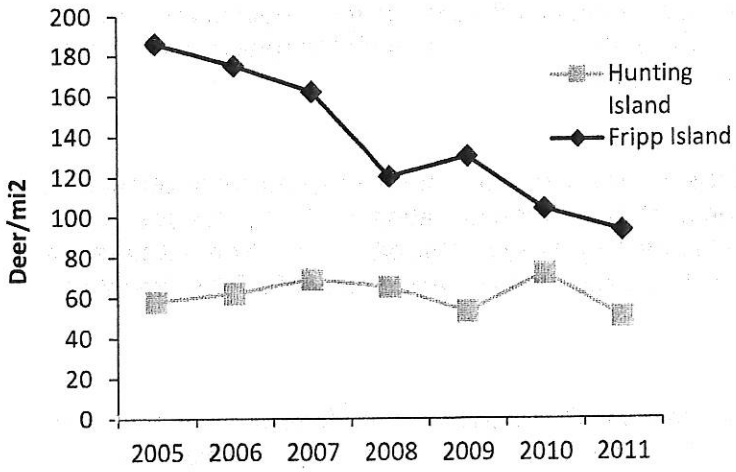
From Rutberg & Naugle 2008 *Wildlife Research* 35:494-501

National Institute of Standards and Technology, MD, 1993-2008



From Rutberg & Naugle 2008 *Wildlife Research* 35:494-501

Deer Population Densities at Fripp Island and Hunting Island (Control Site), SC, 2005-2011



From Rutberg et al. 2013 *J. Zoo Wildl. Med.* 44(4S):75-83