Wildlife Response, Innovations & Services

THE HUMANE SOCIETY
OF THE UNITED STATES
Use of Fertility Control to Manage Urban White-Tailed Deer Populations

Stephanie Boyles Griffin
Senior Director
Innovative Wildlife Management & Services
The Humane Society of the United States
July 13, 2015
Fertility Control Methods

- Immunocontraception
- Surgical Sterilization
PZP (porcine zona pellucida) is a protein extracted from pig ovaries.

Vaccination of female deer with PZP yields antibodies that block fertilization.

Feeding PZP to animals (or people) does not work. If eaten, it is digested.
How PZP works?

- Egg
- Zona Pellucida
- Zona Pellucida Antibodies
Where has PZP been used?

- White-tailed deer
- Wild horses
- African elephants
- Bison and elk
- Zoos
“Native PZP” emulsion vaccine requires annual boosters
• ~$25/dose

“Timed-release” PZP vaccine administered once every 2-3 years
• $230/dose
For opportunistic remote delivery, a custom-designed dart was created to inject the liquid primer/time-release pellets and then eject from the targeted animal’s body.
How is PZP delivered?

PZP vaccine consists of liquid primer and several time-release pellet doses.
Benefits of PZP?

- Not passed through the food chain
- Does not affect unborn fawns or their future fertility
- Improves the overall health of the doe
- It is reversible
- PZP has been proven effective over 90%
How well does PZP work on deer?

- **On individual females**
  - Native PZP with annual boosters yields annual fawning rates of 5-10%
  - Timed-release PZP yields pregnancy rates of ~5% in first year and ~25% in second year
Fire Island National Seashore, NY
Population Changes at Fire Island (Kismet-Lonelyville)
National Institute of Standards and Technology (NIST), Gaithersburg, MD

- 1 mi²
- Surrounded by dense suburbs
NIST Deer Study

- Efficacy testing vs. studying population effects
- 748 deer captured and tagged, 1994-2006
- ~1,500 PZP treatments delivered
Fripp Island, South Carolina

- ~4 miles$^2$
- Residential & retirement community
Hunting Island Control Site

- 6 mi² state park
- 0.5 miles across inlet from Fripp Island
- No hunting or other active management
Capture & Treatment: 2005-2010

- 258 females captured, tagged & vaccinated with one of several one-shot PZP test vaccines
- Some females received dart-delivered boosters beginning in 2006
Population Fawn/Doe Ratios, Fripp Island 2006-2011
Deer Population Densities, Fripp and Hunting Islands, 2005-2011

Deer/km²

- Hunting Island
- Fripp Island

Y-axis: Deer/km²
X-axis: 2005 to 2011

Graph shows a decrease in deer population densities from 2005 to 2011 for both Hunting Island and Fripp Island.
Fewer Deer, Healthier Deer?

- Decreased visibility of deer during daylight hours
- Increased community tolerance for deer
Causes of Rapid Decline on Fripp

- Without need to boost every year, field effort focused on untreated animals.
- ~20% annual adult mortality combined with very low fawning rates
- Little immigration from outside
Can multi-year vaccine be delivered remotely?

Can contraception control deer populations on “nonislands?”
This technique removes the deer’s ovaries and is similar to, but less invasive than a cat or dog spay.

The animal is typically in and out of surgery in less than 20 minutes, and the mortality rate is less than 1%.

The technique begins with deer capture via tranquilizer dart. The deer is then transported to a surgical bay.

The surgical prep and surgery take approximately 20 minutes.

After surgery, the deer is returned to the field, a reversal agent is administered and the animal is observed from a distance to ensure all is well.
Mobile Surgical Theater
Tranquilized Deer Carried to Mobile Surgical Theater
Deer Shaved for Surgery
Deer in Surgery
Deer on Stretcher Post-Op
Vet Administering Reversal Drug
Mask Covers Eyes for Final Step
Collared/Tagged Deer Months Following Surgery
# Surgical Sterilization

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<tr>
<th><strong>Pros</strong></th>
<th><strong>Cons</strong></th>
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<td>- Only handle the animal once</td>
<td>- Delayed population reduction as deer persist in the landscape</td>
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<td>- Can use a variety of volunteers to reduce costs</td>
<td>- Cost is higher than other methods</td>
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<td>- 100% effective for all animals</td>
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<td>- Removal of the ovaries reduces movement in landscape due to breeding behavior</td>
<td>- This is not a permitted management option in most States, it is still only permitted as research.</td>
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<td>- Very low mortality rates.</td>
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Surgical Sterilization

Villages Cayuga Heights, NY

- 1.8 miles² open suburban community
- ~95% sterilized in Year 1 (2012)
- All remaining females sterilized in Year 2 (149 total)
- ~30% decline after one year
- Immigration 3 females/year
- Surgical mortality <1%
Villages in San Jose, CA

- 700 acres fenced (only 6-7 ft high) with open front gate
- ~90% sterilized in Year 1 (started in 2013)
- All remaining females sterilized in Year 2 (115 total – October 2013)
- 30 deer “relocated” outside the fence with 55% returned
- ~20% decline after one year
- Immigration 2 females/year
- Surgical mortality 1%
Surgical Sterilization

- Phoenix, MD
  - Single point of access on 14 acres
  - ~50% sterilized in Year 1 (33 total - started in 2011)
  - ~75% sterilized in Year 2 (50 total)
  - ~80% sterilized in Year 3 (59 total)
  - ~90% sterilized in Year 4 (69 total)
  - Annual mortality ~10%
  - Immigration 3-4 females/year
  - Population stable
  - Surgical mortality 0%
Surgical Sterilization

- **City of Fairfax, VA**

- 5 miles² open suburban community

- ~40% sterilized in Year 1 (18 total - started in 2014)

- Immigration unknown

- Surgical mortality 0%
Starting New Deer Projects

1. Initial Contact
2. Off-site assessment
3. Site visits
4. Project development
5. Project implementation
Initial Contact/Off-Site Evaluation

- Contact local official in authority

- Preliminary investigation (remote)
  - Site characteristics, number of deer, closed, open or semi-open system, deer accessibility, etc.
  - Stage of decision making, public interest and support, state agency involvement
Site Evaluation

Biological/logistical project feasibility

- Is the deer population accessible?
- Can they be captured/darted safely?
- Can we get land access?
- How are adjacent lands being managed?

Political & fiscal feasibility

- Public talks
- Meetings with community leaders
- Initial contact with state agency
Building the Project

- Design the project
- Identify and train field personnel and other collaborators
- Write proposals
- Apply for State/federal agency research permits
- Institutional Animal Care & Use Committee (AWA compliance)
- Federal regulatory compliance (EPA experimental use permit)
Implementing the Project

- Secure permits and permissions
- Purchase equipment, supplies, and vaccine
- Schedule field work, including lodging and vehicles (if needed)
- Conduct additional field training of new personnel
Example: Hastings-On-Hudson, New York

- Winter 2013 – HOH meets with New York Department of Environmental Conservation (NYSDEC)
- Spring 2013 – HOH prepares and submits proposal to NYSDEC
- Summer 2013 – HOH revises proposal according to NYSDEC comments and recommendations
- Winter 2013 – NYSDEC grants research permit to HOH
- Winter 2014 – HOH, Tufts University and HSUS launch public/private deer fertility control project