Hastings Deer Immunocontraception Study

Field Safety Protocols

Hastings-on-Hudson

February 2014

Contents

Introduction

This document describes the safety protocols to be implemented during the Hastings-on-Hudson Deer Immunocontraception Study to begin in March 2014. Hastings-on-Hudson, in concert with The Humane Society of the United States, the Cummings School of Veterinary Medicine at Tufts University, and with support from In Defense of Animals, will engage in a five-year study involving controlling the white-tail deer population through the injection of the PZP (porcine zona pellucida) immunocontraceptive vaccine. The objective is to control and bring down the population of white-tailed deer by substantially lowering the birth rates of local does. If the study should provide evidence that the numbers of white-tailed deer are substantially reduced, we would move to a regular protocol where there would be no need to immobilize deer and the Village would dart the deer directly with the PZP agent.

During the first three years of the study, deer within Hastings-on-Hudson will be captured by being darted with a combination of two anesthetic immobilizing agents (Xylazine and Telazol HCl). Deer that do not become fully sedated may, when appropriate, receive additional injections of the Xylazine/Telazol combination and/or Ketamine delivered in 1-3cc Pneu-Darts or by hand. All controlled substances and other drugs necessary for capturing and handling deer will be handled and used under veterinary supervision. After the first year, in subsequent years, any tagged deer will be darted directly with the PZP vaccine and not be immobilized.

This document describes the provisions taken while the darting professionals are in the field to ensure that public safety is fully maintained.

Study Overview

Hastings-on-Hudson has examined a range of possible deer control approaches and decided to pursue immunocontraception. The New York State Department of Environmental Conservation issued a scientific Permit to Collect or Possess authorizing the study in December 2013. The protocol has also been reviewed and authorized by the Tufts University/Tufts Medical Center Institutional Animal Care and Use Committee (IACUC protocol #G2014-09). Under the approved protocols, during the winters of 2014 and 2015, up to 60 female deer (or more if accessible) will be captured via chemical immobilization delivered via darts. They will then be ear-tagged, blood-sampled for pregnancy testing, and administered an initial treatment of PZP engineered to release at 1, 3, and 12 months. Treated deer will be monitored for fawns to determine whether observations are consistent with pregnancy test results, and monitoring procedures will be adjusted in subsequent years if there are significant inconsistencies. To measure vaccine effectiveness and longevity, fawning of treated deer will be monitored for two to three years after initial treatment. The study will proceed for five years.

Beginning in late summer 2015 or 2016, all treated deer that can be relocated will receive dart-delivered boosters of PZP/FIA emulsion alone or PZP/FIA emulsion plus PZP/QA-21 in lactide-glycolide polymer pellets engineered to release at 1, 3, and 12 months. Fawning of boosted deer will be monitored for 2 to 3 additional years to determine whether the two treatments differ in effectiveness and longevity.

At the same time, we will use semi-annual camera-trap surveys, monitoring by resident volunteers, and other methods to examine trends in population fawning rates, population size, and to the extent practical, mortality/disappearance rates.

All deer captured with chemical immobilizing drugs and/or treated (injected) with immunocontraceptives will be fitted with two plastic ear-tags (one in each ear) marked with unique identifying numbers. Tags will be labeled on the back with “EXPERIMENTAL ANIMAL, DO NOT CONSUME” and a telephone number where information could be obtained in the event an animal is killed or found.

Initial study sites will include Hillside Woods, a portion of the Children’s Village facility within Hastings, the Andrus Nursing facility and, if permission is granted, Andrus Children’s Facility. Appendix A includes a map displaying these locations.

Protocol Overview

Introduction

While each deer immunocontraception project is unique, safety protocols are similar from site to site and share a focus on public safety. Public safety issues fall into the following categories and are addressed in this document:

- Safe handling of chemical immobilizing (CI) drugs
- Safe darting
- Deer flight protocols
- Deer handling protocols

An important component of any immunocontraception project is public communication, and we cover that as well in this document.

The deer darting professionals involved on the project have been rigorously trained and have participated in the darting of over 3,000 animals. Training has included the use of darts, handling the immobilizing drugs, and capturing deer. Training also includes a review of all local laws, permits and licenses.

A Note on Deer Behavior

While the white-tailed deer in a suburban community are deer that have adapted to a human-centric environment, they remain wild animals. The only difference between deer living in Hastings-on-Hudson and those living in wild areas is that those in Hastings have learned to live much closer to people. They have become habituated to crossing streets, navigating through yards, and moving around man-made obstacles without harming themselves or people. While deer seen in Hastings-on-Hudson may seem more passive when compared to deer in rural o wild areas, they still possess the startle and flight reflexes when reacting to danger. As a result, the most difficult part of darting and capturing deer is attempting to predict their likely flight direction when threatened (i.e. hit with a dart): deer know their environment and will bolt to where they feel safest.

Safe Immobilizing Agents Handling Protocol

Introduction

The most effective method to capture deer is to remotely inject them with chemical immobilizing (CI) drugs. Typically, three drugs are used: Xylazine, Telazol, and Ketamine. (These are listed in Appendix B.) Two of these are listed as Class III controlled substances by the Drug Enforcement Administration (DEA) and are therefore strictly controlled. These drugs can only be gotten from a licensed veterinarian and on HSUS deer immunocontraception projects they are only handled by people with extensive training and experience. The Anesthetic Custody Protocol published by the village describes the safe-keeping and transfer of these drugs. This protocol describes the safe handling of the drugs in the field.

Protocol

1. **Authorized individuals**
   Only authorized individuals should handle the CI drugs. (These are listed in Appendix C.)

2. **Safe handling basics**
   The agents should always be in clearly marked and sealed bottles that are typically deposited at a secure facility. We will store the dart projectors at the gun safe in the Village (Dan-Inject Model CO2 PI Injection Pistol, Dan-Inject JM Standard Injection Rifle, and Pneu-Dart X-Caliber Gauged CO2 Projector/Rifle). Any time that the drugs are withdrawn from the secure facility and handled by the authorized individuals, the individuals should wear rubber or latex gloves.

3. **Agent retrieval**
   The authorized darting professional should retrieve only the quantity of agents necessary for that days' work from the veterinarian's office. The CI drugs typically need to be reconstituted and then mixed ("compounded"). Telazol is reconstituted to 200mg/ml with the addition of 5ml sterile water. For capturing deer this combination is best done with 2.5ml of Xylazine at 100mg to provide a formulation of 200mg/ml Telazol/100mg/ml Xylazine. This combination produces 3 doses of drugs enough to capture 2-4 deer depending on weight. Reconstituted Telazol has a short shelf life (3 days room temperature, 10-14 days refrigerated) so to avoid waste the combination is typically done in the field as needed for capturing deer. Drugs should be mixed on a level surface and care ensured that minimal spillage occurs. All bottles should be firmly resealed.

4. **Agent deployment**
   The agents will be transferred by the darting professional to a self-injecting 1 cc Palmer Cap-Chur transmitter darts or other appropriate darts. This should be done while the darting professional is gloved, and the darts should be capped with (cork/cap) when full with IC compound.

5. **Handling Breakage and Spillage**
   Any broken needles and spilled or empty bottles should be placed in a Sharps container and immediately sealed.

6. **Agent Return**
   At the end of the darting field work, the darting professional will return to the veterinarian's office and turn over any remaining compounded agent, unutilized darts. If there were broken, emptied or spilled drugs, a notation should be made the they were disposed in the Sharps container, which will be disposed of according to AVMA standard protocols at the end of the project.

7. **Study conclusion**
   Expired or excess controlled substances must be disposed of in the original bottle by marking the bottle "expired" and then disposed of in accordance with DEA directions and AVMA guidelines for proper disposal of controlled substances (expired controlled substances and any other drugs used will be returned to the veterinarian for disposal at the completion of the operation). All syringes, needles, darts, etc. used for mixing drugs, transferring drugs to darts, or injecting deer and containing drug residue will be disposed of in approved Sharps containers in the field and properly disposed of upon completion of each year's capture work.

8. **Handling Loss or Theft**
   If a theft or discrepancy is noted and verified, it should be reported to the DEA via the standard procedures and submission of a DEA Form 106. A loss should be reported on DEA Form 41.

9. **Handling Accidental Puncture or Injection**
   If the darting professional or other individual accidentally punctures or injects himself, he or she should seek immediate medical attention.

Safe Darting Protocol

Introduction

Deer will be captured during February-March after New York deer hunting season has concluded and more than 60 days prior to the start of any deer hunting seasons and before the last two months of pregnancies in deer when fetus's may be susceptible to the effects of drugs. The listed drug combination will be loaded into self-injecting 1 cc Palmer Cap-Chur transmitter darts with 1" needles and single wire barbs or Pneu-Dart self-injecting 1cc transmitter darts with 1" needles and double or single wire barbs. The darting professional will shoot the darts into the hip from a Dan-Inject Model JM Standard CO_2 projector Dan-Inject CO_2 Bol-Jector.

These drugs are relatively safe when injected into deer: since 1996 there have been less than 5 deer fatalities out of 5000 darted deer as a direct result of drug complications. Just as important there has never been a dart or drug related injury to any person at any site where the HSUS has done a deer project.

For these reasons before any shots are taken at any deer the entire area, situation, and possible outcome is scrutinized to determine both the safety of people and the deer. In fact, for every shot that is taken, there can easily be 10-20 shots not taken because of potential dangers to people, property, or deer. For this reason the HSUS works under the philosophy that it's better to wait for another shot on another day than it is to take even the slightest risky shot.

With this background here are the precautions taken to insure people, property, and deer are not harmed as a result of darting and capturing deer.

Protocol

1) **Team Identification**
   The darting team should wear orange or otherwise brightly colored vests marked as "Deer Team". The Police Department, especially the desk sergeant on duty, should be aware at all times when and where the team is in the field.

2) **Locational awareness**
   Deer should never darted when there is a reasonable chance that a missed dart may hit another deer, person, pet or other animal. An area should be selected which minimizes the chance of a deer bolting directly into streets or roads, people, houses or property.

3) **Bait Stations**
   The goal of a bait station is to attract deer into areas where they can be easily and safely darted, with no threat to public safety.

Since bait stations can attract numerous deer, they must be set up:
- In areas where there is minimal risk of deer traffic across private properties or any area where deer may damage property;
- With full consideration of where deer may go after they have been hit with a dart. Bait stations should never set up near busy roads or streets or in areas around buildings where escape is limited;
- With signage indicating their purpose and use.
Any station set up that later proves to be defective or dangerous, regardless of how many deer it may attract, should be taken down and not used.

4) **Absence of people or pets**
Darting will occur in areas that, while secure, may conceivably have people or pets roaming freely. Before any dart is released, the darting professional must check and ensure no authorized or unauthorized personnel are in the potential field of dart release, and that there are no free-roaming pets in the vicinity.

5) **Assess Deer Health**
Prior to darting, each target deer's physical condition is assessed. Any deer showing signs of weakness, malnutrition, or old age will not be darted.

6) **Deer position**
Deer are only to be darted in the rear flank and only when they are standing broadside to the darting professional. Deer should never be darted when they are moving.

7) **Dart Recovery**
Should a dart miss the target deer, it should be recovered immediately and secured. Remaining fluids should be drained, and a (cork) placed over the needle.

Deer Flight protocol

Introduction

When capturing deer with drugs, deer react to the anesthetics differently depending on their weight, age, and/or health. Typically, drugs take from just a few minutes to more than 20 minutes to take full effect. During that time a deer can travel a considerable distance and the more frightened it is, the longer it can take.

Dart transmitters have a tracking range of approximately 1 kilometer and will be tracked with a Telonics TR-4 receiver and Yagi antenna. Every effort will be made to recover darts.

The HSUS use the best equipment available and the most tried and true techniques for capturing deer, with the understanding that all environments are unique and each darting event is unique. There are times when everything is done correctly but adeer cannot be captured. The single most likely problem encountered is when a dart fails to discharge properly. This occurs infrequently and is not harmful to deer or people: occasionally a deer can carry a dart attached to its hip for an extended period of time. Carrying darts are rarely harmful and they usually fall out in 1-2 days.

Deer reactions can vary widely from site to site and even at the same site. However, generally their responses are dependent on how acclimated they are to people. One deer accustomed to being around people every day may stay at the same spot where it was darted, whereas a deer that spends most of its time avoiding people could bolt and run several hundred yards. Typically a deer's response to being hit with a dart is to run a short distance, usually either into cover or to an area where they feel safe (over hills, behind buildings, into trees, or just out of sight of the darter). Their flight often means they can cross properties, zigzag around houses, and cross streets. Therefore, the most important consideration a darter must take is, where could the deer go after being darted.

Protocol

1. **Immediate Post Darting**
   The darts used for capturing deer are designed to hit, inject, and remain attached. The darts used at Hastings-on-Hudson will also have small radio-transmitters inside them. These transmitters, depending on terrain, buildings, and vegetation have ranges of ¼-½ mile. The object with them is to hit the deer, inject the drugs, and wait until the drugs take full effect before tracking and disturbing the deer. Once the deer is darted, the

darting professionals and any attendant personnel will remain stationary and provide the deer with a ten minute window for the anesthetic to take effect.

2. **Tracking**
   If the deer is within sight and has lay down, the deer professional will approach the deer and verify its level of sedation. (See next protocol). If the deer has bolted out of sight, the darting team will proceed in the direction of the bolted deer to locate the deer, relying on triangulation.

3. **Tracking through private property**
   In some cases, the deer may pass through several private properties before coming to a full stop. As the team follows the signal or trail, they will attempt to inform property owners as they pass through the properties in their pursuit of the deer. No fewer than two members will transverse a given property. If there is any property damage caused by the fleeing deer, it should be noted.

4. **Tracking onto private property**
   If the deer has entered onto private property and is verified as fully sedated, the team will attempt to alert the home owner of the location of the deer, advise them to remain at a distance, and then take action as defined in the next protocol. No fewer than two members of the team, ideally with the presence of police officer or other village employee, should ever enter private property. If no one is at home during the event, the team will take action and record the house location of the deer on their tracking forms. If there is any property damage caused by the fleeing deer, it should be noted.

5. **Dislodged darts**
   If the dart becomes dislodged, the darting professionals must make every effort to recover the dart using the radio equipment. Deer Dart Drugs in darts failing to discharge will be disposed of according to American Veterinary Medical Association (AVMA) guidelines.

Deer Handling Protocol

Introduction

Once the deer have been struck with the CI drug dart, they will be tracked to their resting location. Occasionally deer hit with darts containing capture drugs do not become fully sedated and must be further sedated so they can be safely handled. Once safely sedated, the darting professional will carry out a number of measurements, tag the ear, and then inject the PZP. A typical capture, from the time a deer is darted until it is back on its feet again can take 50-90 minutes. A deer that needs to be darted a second time can take much longer.

Protocol

1. **Approaching the downed deer**
   Once the tranquilized deer is located, the darting professionals will approach the deer to verify that it can be safely handled. Any volunteers present for the darting effort should remain at least fifteen feet distance in case the deer is not fully sedated: they can rear up in panic and potentially harm an individual too close. The darting professional will assess the deer's condition.

2. **Administering additional sedation**
   Depending upon the amount of sedation, the deer may need to be given additional drugs. The additional immobilizing drugs can be administered either by hooting another dart or injecting them by hand if tyhey have been downed but not yet unconscious. The darting professional will wait and determine if the appropriate amount of sedation has been reached. If the deer was still standing and needed to be darted again, the entire process of waiting, following and then assessing them can begin again.

3. **Measurements**
   The darting professional will take vital signs (heart rate, respiration, and temperature) and take measurements. These will be logged on a form (see Appendix D). The professional will then-tag both ears, and inject the vaccine.

4. **Deer reanimation**
   Within typically 40-90 minutes from the time it was darted, the deer is injected with a drug to reverse the effects of the capture drugs. Once reversed a deer's reaction can range from continuing to lie in place, jumping up and running away, to kicking and thrashing around for several minutes. Typically, the deer wake up slowly, get up on

their legs, and trot off. During this period, the darting professionals and any volunteers typically retreat to twenty feet.

5. **Post-recovery period**
   Full recovery from the effects of the drugs can take 12-24 hours and it is not uncommon for a deer get up, move around for a few minutes, and lay down and go to sleep. When this occurs it is best to leave them alone. When possible the captured deer should be observed again within 24-48 hours to check on how it is doing.

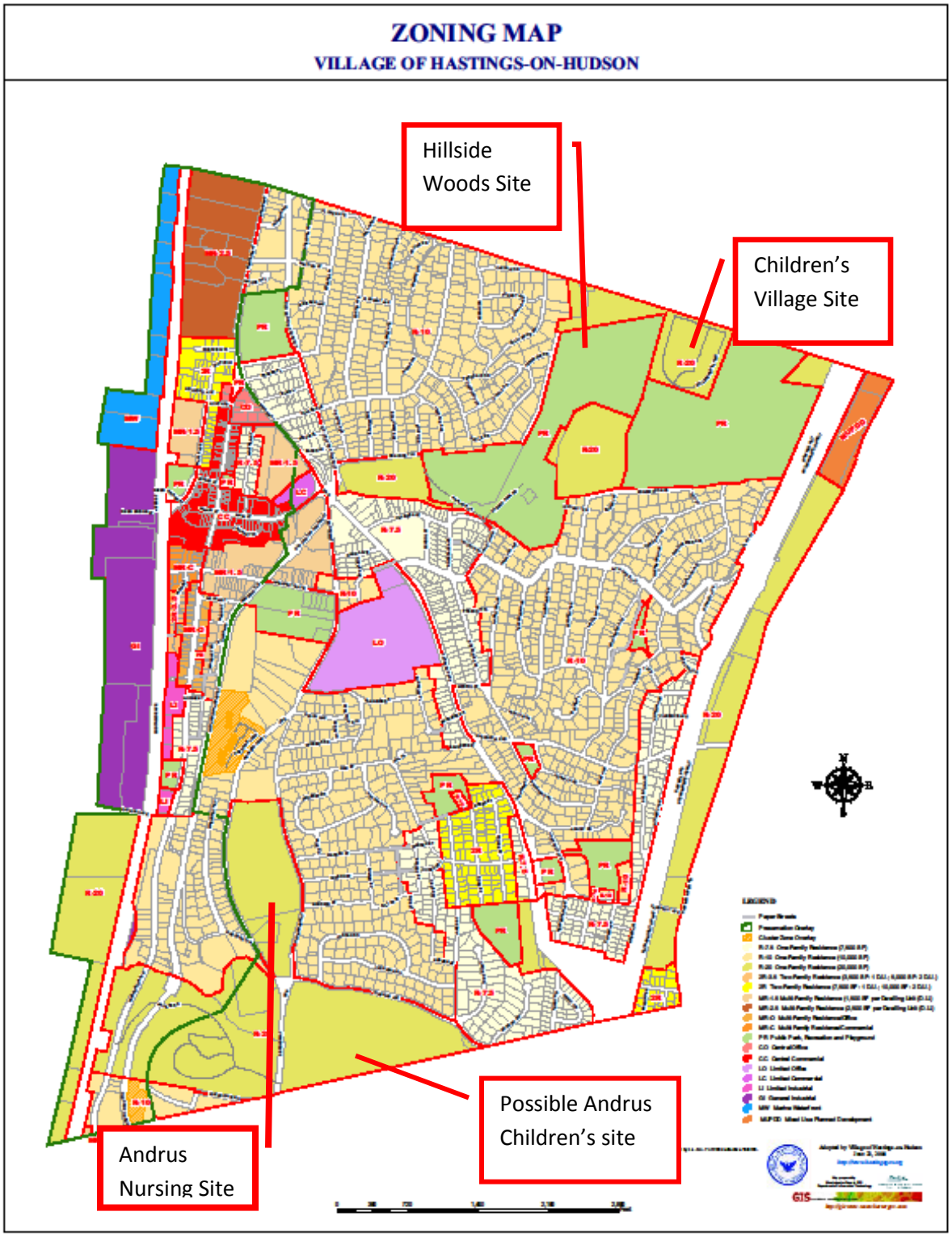
Communications Protocol

Most people are unfamiliar with the process of darting and capturing deer. Without some preparation, the deer sedation process can be unsettling. For these reasons, it makes sense to do everything possible when darting and capturing deer to keep the public informed of what is being done, why it is being done, and also what to expect if a deer ever does show up on private property.

1. **Public outreach**
   The village government should send out flyers and notices, post ads, and send e-mails that will reach as many people as possible. This may take the form of an email such as found in Appendix E.

2. **One-on-one outreach**
   The darting professionals should communicate with people one on one: when they are in the field, they should make every effort to speak to people as they are encountered and explain the process, This takes considerable effort but has proven to be very effective.

Appendix A: Study Locations



Appendix B: Agents utilized

Telazol: A Schedule III substance under both the federal Controlled Substances Act and NY State Public Health Law (NYPBH section 3306).

Ketamine: A Schedule III substance under both the federal Controlled Substances Act and NY State Public Health Law (NYPBH section 3306).

Xylazine: Not considered a controlled substance under the CSA or New York State law.

Other agents utilized

1 Dopram V @ 20mg/ml (25ml)
1 Tolazoline @ 100mg/ml (100ml)
1 Antibiotic (liquamycin LA-200) (100ml)
1 Euthasol (100ml)

Appendix C: Designated Individuals

Authorized Darting Professionals

Rick Naugle

Kayla Grams

Appendix D: Deer Capture Data Form

THE HUMANE SOCIETY OF THE UNITED STATES CHEMICAL IMMOBILIZATION DEER CAPTURE DATA FORM

Animal Number_____

Date (mm/dd/yy)____/____/____ Capture Location:_____

Weather:_____ Temperature:_____

Recorder:_____ Gunner:_____ Spotter:_____ Monitor:_____

Time Darted:_____ Time Recumbent:_____ Time Released:_____ Down Time:_____

Tag Numbers: Left ear #_____ Right ear #_____

Sex: (circle one) M F Estimated Age:_____

Physical Condition:____ (1-4)(1=excellent, fat, 2= good, not fat, 3=fair, bony, 4= poor, emaciated)

Pregnant/Lactating: (circle one) Yes No Unknown

Hind-foot Length:_____ Girth:_____ Body Length:_____ Weight:_____

Blood Collected: Yes No Reason:_____ Fecal Collected: Yes No Reason:_____

PZP Treated: Yes No Dose:_____ Adjuvant:_____ Hip Injected:_____

Antibiotic Administered:_____

Chemical Immobilizer Drug Log

Drug	Concentration	Dose/Volume	Route	Purpose	Effect	Time

Vitals Monitoring

Time						
Temp (°F)						
HR						
Respiration						
Pulse Oximeter						

Injuries, Problems, Comments:

_____

_____

_____

Signature:_____ Date:____/____/____

Appendix E: Village Communication on Public Safety

Fellow residents,

This weekend, we begin the deer immunocontraception study in Hastings. This email describes how this will affect you and what you might see as it unfolds over the month of March. Since the darting will occur in Hillside Woods and on the Andrus property (as well as other locations), almost everyone is within range of experiencing the process first-hand.

This effort will consist of two trained Humane Society professionals (their names are Rick and Kayla) who will be darting deer with anesthetics in various parks in town. The deer will be sedated by the drugs and then be injected with the actual immunocontraceptive drug, have their ears tagged, and then released.

First of all, we are going to ask that anyone walking their dogs in the park strictly obey the leash laws during the month of March. You should, naturally, be obeying the leash laws at all times (it is almost never cute to have a strange dog jumping up on non-owners), but during the duration of this study, we do not want the dogs spooking the deer or interfering in the darting. Leash laws (yes, we have them) will be immediately enforced (no warnings).

1) Feeding

The Humane Society professionals will be surveying the woods this week and determining where best to start. They will likely deploy a barrel-like device filled with corn that will automatically dispense the feed at certain times during the day. This device will be unmistakable should you encounter it, though it will have a sign indicating its purpose for those not informed. The feeder will quickly habituate the deer, who are quite hungry by this point in the winter, to congregate for feeding. Please do not disturb the feeders and please keep your pets away from them as their scent may discourage the deer.

2) Restricted Park access

On those days when the darting will actually happen, we will restrict access to those parts of Hillside where the darting will occur. There will be clearly marked yellow tape and possibly volunteers, village employees, or police officers who will be waving off dog walkers and the curious. Please respect the tape and the restricted access. The entire park will not be off limits. This may be for a couple of hours or it may be for much of the day. It will depend upon the success we are having in that location.

3) Darting

The darting professionals will wait until they have a clean shot at a still deer when the dart will hit the flank of the deer. This typically happens at a distance of 25-35 feet. Upon impact, the dart will discharge the anesthetic into the deer and remain imbedded in the deer because of barbs in the dart needle. The deer will typically bolt at this point, and run some distance from the site of the darting. The professionals will not pursue the deer for several minutes as they will want to give the anesthetic five or ten minutes to take effect. If the deer is out of sight, the Humane Society professionals will use a radio receiver to home in on the radio beacon that is a part of the dart still imbedded in the deer. This radio receiver device looks like something out of a cold-war era movie, a metal loop on a stick attached to a box. If you see a man or woman in an orange reflective vest walking through the woods or down the street holding such a device over their head, you will know what you are looking at. Very occasionally, the dart may become

dislodged. While the Humane Society professionals will do their level best to retrieve the dart, on the off chance that they don't but that you encounter it, please do not touch it but instead, call the police (478-2344) and they will vector someone in to retrieve it. This is the moment where I should mention that the darting professionals have done this over 3,000 times in a variety of settings and have never had an accident.

4) Deer treatment

The deer will eventually become sedated and lie down. This may be in the woods, and it also may be (depending upon how far the deer ran) out in public, perhaps even in your front or backyard. The deer, while sedated, is not a predictable animal. PLEASE DO NOT APPROACH THE ANIMAL. It may not be fully sedated, may rise up and startle. If you do not have the Humane Society professional within sight, please phone the police and report what you have found (478-2344). The Humane Society professional will be there in a matter of minutes to process the deer. He will first verify that the deer is fully sedated and if not, ensure it is so by additional injections. Then the professionals will tag both ears with very large and visible tags, carry out some measurements, and then inject the deer with the immunocontraceptive. The deer will take some time to revive (20-60 minutes). The Humane Society professional will remain near the site until the deer is conscious and ambulatory. At no point in this process should you approach the team: they are working and the deer may come to unexpectedly.

5) Deer release

The deer will amble off with its new ear-tags and hopefully not calve new fawns in the subsequent two years. It may decide to lie down a little later and sleep off the anesthetic. Do not worry about the deer: that is normal and it will be fine.

Over the course of four weeks, we hope to treat a substantial number of the does in these woods. This is really the first trial run of the study, and if we succeed in treating 20-30 does, it will be a fine first effort. You may land up wondering why you continue to see so many untagged deer. Remember that only does are being treated, so a substantial portion of the untreated deer are going to be bucks or juveniles.

This study will progress through the full month of March. You're likely to encounter Rick or Kayla throughout the month in their signature orange vests, possibly carrying darting gear or their radio antennas. They'll be pleased to explain what they are up to - up to a point. Remember that they have a job to do and please allow them the time to do it. They've done this in wild and suburban locations for many years and have never had an accident or major issue. Their primary concern is your safety, and they will let deer walk by if they think there is any remote risk to resident or wayward pet. But we want their effort to be successful and ask that you respect the yellow tape, respect requests to remain at a distance, and keep your dog on a leash. As docile as the deer may appear, darted or undarted, they remain wild animals with an instinct to startle and flee or rear up and defend themselves if no other option presents itself. Don't give them a reason.

This is an exciting moment. This study will draw substantial attention since so many communities have the same problem, and we are eager for it to run smoothly and effectively. If you have questions, please write me or, if you see them, ask Rick or Kayla. The website (here) will also have a full description of our safety protocol