# STATUS REPORT ON THE HASTINGS-ON-HUDSON DEER IMMUNOCONSTRACEPTION STUDY MARCH 2014

This document describes the results of the Hastings-on-Hudson Deer Immunocontraception Study this year. It provides some background, and then describes what happened, what we learned, what we spent, how we will track our results, and what next year will look like.

#### **Background**

Village of Hastings-on-Hudson is working with The Humane Society of the United States and researchers from the Cummings School of Veterinary Medicine at Tufts University on a fiveyear project that seeks to control the area's white-tailed deer population with the use of a PZP (porcine zona pellucida) immunocontraceptive vaccine. With financial support from In Defense of Animals (an animal rights organization), the project will use this humane and non-lethal vaccine in an effort to substantially lower the birth rates of local does and eventually bring down the population of white-tailed deer.

While prior research with the PZP has been carried out on islands or contained areas, this is the first effort of this sort in a suburban community in this country. Hastings-on-Hudson has examined a range of population-control approaches and decided to pursue immunocontraception as a non-lethal and sustainable method of reducing the herd, which has grown considerably in recent years to untenable levels. The increase in deer has resulted in the destruction of the understory in parks, damage to private gardens, and vehicular accidents.

The Village has worked with the New York State Department of Environmental Conservation (DEC) to define the experiment and the DEC issued a "Permit to Collect or Possess" authorizing the study, in December 2013. Under the approved protocols, deer are captured via chemical immobilization delivered via darts. They are ear-tagged, blood-sampled for pregnancy testing, and administered an initial treatment of PZP. The darting was carried out by highly trained professionals from the HSUS over a four-week period. Treated deer will be monitored for fawns to determine vaccine effectiveness and longevity for two to three years after initial treatment.

If the number of white-tailed deer are substantially reduced over the next five years, the Village will move to a regular protocol in which professionals would dart the deer directly with the PZP agent.

## What happened

Hastings concluded the first year of a five-year study of the viability of immunocontraception this March. It was marked by a steep learning curve as our darting team learned our local deer behavior and habits. We changed strategy on how to locate and dart deer at least two times, and were successfully darting deer every day by the end of this first phase. We're pleased with where we are: we have a very good idea of what will work and can plan for a more robust effort next year. We did not come close to our original objective of 20-30 does darted this year, and plan to compensate next year by darting substantially more does.

The actual on-ground effort is best described in a week-by-week narrative of the month-long effort. It is important to remember that the tagging effort operates under strict safety protocols. Deer were only tagged at close distances (under 30 feet) when there were no people nor possibility of striking people anywhere in the possible field of fire. The deer needed to be struck in the hind quarters for the dart to be most effective, so had to be struck "broadside", and not head-on or at an oblique angle.

#### Week One

The original effort was based on the assumption that we would bait the deer in the woods for a week, draw them to the bait stations, and then dart them. We had hoped to have a longer period to dart the deer, but only received our last permit in late February. As a result, we were only able to start placement of the bait stations in late February. These bait stations are approximately five feet high tripods that are programmed to dispense cracked corn (or other food) up to six times a day. They are utilized to draw deer to a location and habituated to that location so they can be eventually darted.

Both February and early March were periods of heavy snow and resulting snow cover. During periods of heavy snow, deer do not spend much time in woodlots. (Deer, like us humans, fear icy patches and hurting themselves in deep snow or slipping on ice. It is safer in our yards.) Even after snow melts there is very little forage in woodlots. Deer bed down there during the day (near edges) and feed in the community at night. As a result, the bait stations in the woods weren't terribly effective in drawing deer. Additionally, our deer were comparatively fat and healthy (there was a very good acorn crop in 2013 on which they had gorged) so they weren't drawn into the woods, despite the free food. During this first week, the team did not dart a single deer.

#### Week Two

Our first shift in strategy was to move from assuming that feeders would be the mechanism by which to draw deer . Instead, we decided to move to attempting to dart deer in people's back yards. We sought and received permission from perhaps a dozen people to dart on their property: this also included permission from all neighbors

As it developed, the deer were not particularly cooperative. The deer were not there when expected, and in those cases when they were, when our team approached, they ambled onto properties where permission had not been granted. Deer are highly adaptable and far more intelligent than many of us grant them: they recognize unusual behavior and become quickly

suspicious. Walk your dog, and they ignore you. Step off the road and onto the lawn where they stand, and you have their attention. Despite their caution, the team managed to dart three does. Unfortunately, we were still calibrated the strength of the anesthetic darts and two ran so far away that by the time they were located (via the radio transmitter located in each barbed dart), they were revived and ran off. Only one deer ("1" on the tag) was successfully processed.

#### Week Three

Given the meager outcome of two weeks of work, the team decided to recalibrate the approach once again. We took a week off to review our procedures and decided to saturate the neighborhood around Hillside Woods by asking virtually every house for permission. A team of student and adult volunteers fanned out and knocked on doors, seeking permission for darting to occur on people's properties. Over 300 homeowners assented (only 2 or 3 said "no") and we put little red survey flags on those lawns so the team would know where it was safe to dart.

## Week Four

In the five remaining days of the project, our team returned and successfully darted seven does. The large number of homes that granted permission meant that the team could reliably track and tag deer across multiple properties. Darting occurred near repositioned deer feeders, on front lawns, and on a couple of occasions, deer were tagged from the window of the parked Humane Society vehicle. If we had such success from the beginning, we would have easily exceeded our goal of 20-30 deer in this first year.

#### What we learned about our deer population

- The team observed approximately 120-140 deer within Hastings-on-Hudson, with the majority of them being adult and yearling females and fawns. There were very few males observed. Bucks are either ranging nocturnally and/or are (more likely) being poached illegally.
- Deer tend to congregate in large groups when snow is on the ground, but break up into smaller groups when snow melts.
- While bait stations were effective, they clearly needed to be set up several weeks before darting began. It's unknown whether or not they'll work in large wooded areas.
- The best times to dart deer are early morning and late afternoon/evening when they are most active. Some deer do move around during the day and darting should be attempted all day long when possible.
- To dart many of the deer we'll need access to as many private and public properties as possible across the entire village. At least 20% of the deer in Hastings will be very difficult to capture.
- Deer are accustomed to people, but they do not tolerate anyone doing anything out of the ordinary (i.e. leaving the street or walkways to get into position for a shot).
- Within the village, darting deer from vehicles often worked best. Once the team emerged from the vehicle to line up a darting opportunity, it makes deer anxious and successful darting difficult.

- Tracking darted deer in the rugged terrain is very difficult. Tracking deer at night is very difficult. The hills and valleys of the woods result in strong echoes from the radio transmitters and the tracking mechanism doesn't work well. The combination of the two makes capturing deer at night nearly impossible.
- Having volunteers standing on streets or trying to deploy volunteers prior to taking shots is often enough to make deer cautious and alert. Deer are very aware of what is "normal" human behavior, and a volunteer in an orange safety vest standing still is enough to raise their prey senses.

## How much we spent

This effort, as mentioned, is a cooperative project with the Humane Society USA. They provide personnel and some expenses, and we cover the rest. (The particulars have been spelled out in a partnership agreement signed by the Humane Society and the Village.) The Village spent \$15,606.07 on this year's effort. Some of these costs are for equipment that will be used in subsequent year, and others are specific to this year. We received a \$12,000 grant from a animal rights group, In Defense of Animals: we are applying half of it this year (\$6,000), and so the net Village cost in the last fiscal year is \$9,606.07, a little more than we expected.

Our single biggest unexpected expense was hotels to house the two Humane Society professionals who carried out the darting. Next year, now that we have a permit and know the regulatory ropes, we will seek housing for the expected two months, either subletting an apartment or house, or securing housing in an extended stay facility. Hopefully we will control our housing expense better. We've applied for a \$10K grant which we hope to offset next year's additional costs as we ramp up our effort in order to capture as many deer as possible. We seek to spend about the same amount of money next year as we did this year.

## How we will track the results

Part of the Immunocontraception Study is the monitoring of a range of metrics we are tracking to verify the results of the effort. We have already rolled out two metric tracking methods (the "Host a Hosta" study and a website for tracking observations). Two more are being rolled out this summer.

## Host a Hosta

Property damage is one of the most significant impacts that deer have on our Village. Just about anyone with a garden knows that certain plants (e.g. tulips) will typically never survive to flowering before being consumed by deer. Relying on anecdotal reports is inaccurate. Modeling on a protocol established on the Cornell University campus (the "Oak Seedling Sentinel protocol"), we decided to deploy hostas throughout the community as a standardized way to track deer depredation in gardens.

Irene Jong, the resident who has volunteered to coordinate this effort, identified fifty volunteer homes to take a potted hosta. Each year, we will track how many (and which ones) survive. In theory, as the number of deer drop off, more hostas should survive the season. This is a scientifically rigorous way of tracking deer impact on private property.

#### **On-line** Tracking

We have developed a website for logging deer sightings that's used by approximately forty residents who enter their deer encounters. The site, developed by a local resident, Richard Ryan, tracks a range of factors about the deer. A Google Maps utility, developed by a local student, Jordan Alligood, reads this data and creates heat maps displaying where the greatest numbers of sightings are occurring.

#### Exclosures

One of the biggest impacts of deer on our shared environment is the wholesale destruction of the understory in the Village parks. The parks used to have dense bramble and vegetation twenty years ago at ground level. A diversity of species lived in this understory, and the next generation of trees were nurtured there. The deer have chewed down anything native from six feet high (as far as they can reach) down - so it is possible to see most of the way through the woods. This is neither normal nor healthy for the woods - the next generation trees is consumed before they ever mature, and a whole ecology of species that existed in the understory are gone. If the deer population is lowered, we may see some of this vital portion of our shared environment restored as ground-cover plant and animal species survive and thrive.

To track this, we are setting up a couple of exclosures (fenced areas that keep deer out) where we will track the return of native species to see what would happen if the deer were reduced in number. We will also stake out several plots and count species there every year - and see if the numbers change over the course of the experiment. This particular effort is being run by teacher Melissa Shandroff, who teaches the Advanced Placement Environmental Science class in the High School. She received a grant from the Hastings Education Foundation to establish an exclosure where native plants will be actively cultivated. We are working with Ms. Shandroff and her students to extend that study so that enclosures will specifically track how forest regrowth would happen, and how species regeneration (or not) is actually happening. We have managed to integrate this effort into a larger one being run by several environmental organizations in the Hudson Valley and we will be using their sampling protocols.

This is a hugely exciting effort as we engage students in a scientifically valid and important region-wide effort that will tell us much about the current state of the forest as well as the success of the program. Since this study will run for five years, scores of students will have the opportunity to participate in honest-to-God real research, a splendid example of what is called "citizen science". (Students also participated in the actual darting efforts as well, accompanying the darting team and establishing periphery control - most sadly saw little "action", but all saw how projects like this actually happen on the ground.)

## Camera Traps

We need to know how many deer there are to know whether our efforts have worked to bring their numbers down. As mentioned earlier in this report, we believe there are 120-140 deer ranging freely in our village. In the end, the best statistically valid way to count deer is to photograph them in their abundant numbers and then, through statistical methods, analyze the photos taken and come up with a total. This is done by deploying what are called "camera traps" which are specially-designed cameras that are heat-sensitive and automatically triggered when a

warm body passes within ten yards of their lens. These cameras are strapped to trees for a month and photograph every single creature that passes before them. The photos are then downloaded and analyzed. Around fifteen cameras are going to be deployed in a grid around town (largely in park areas, but also on some private property where we would secure permission) sometime in August or September and photograph for 2-3 weeks.

A graduate student, Chris Johnson, will then use well-established protocols to determine to within 5% how many deer reside here. He will be overseen by Mark Weckel, who is an expert on this topic and has run camera traps in a number of projects. We will need to do this every year for the duration of the project, and this will provide us with the most important benchmark of all: have we managed to cut the number of deer down over a five year term. (Photos of anything other than deer are discarded, FYI...)

## <u>Next Year</u>

While we were finally hitting on all pistons the last five days, we realized we would still be better off with more feeding stations and more darting teams. Next year, we will deploy the feeding stations earlier and in greater quantity (at least four and possibly as many as six or even nine). They'll have some time to attract deer, so when the teams finally show up, deer will be habituated to the station sites. We will also try different baits in the bait stations (corn, apples, alfalfa, etc.) to determine which best attracts and holds deer.

We will rely on (at least) two darting teams working independently over the course of anywhere between 4 and 8 weeks, depending upon success. We will seek permission from as many houses as possible to maximize the freedom for our darting teams. This permission is likely to be gathered via email and door-to-door solicitation.

Volunteers were very helpful, and we will be relying on them next year.

As I have emphasized on every occasion this project is discussed, this is a scientific study that seeks to determine the efficacy of this particular method of deer population control. Based on the results of the study, we will then determine if it would make sense for us to continue on an ongoing basis. If, indeed, that is the result, the Village can be proud of providing a significant tool to the hundreds of communities just like ours that suffer this problem. That would be an accomplishment of which we could all be proud.

# Appendix A: Costs

| DEER IMMUNOCONTRACEPTION COSTS<br>Account Code A8020464 |  |   |              |
|---|--|---|--------------|
|   |  |   |              |
|   |  |   |              |
| 2-26-14   | Tractor Supply Co. (M.<br>Gunther purchased) | 50lb. PP Cracked Corn   | \$212.00     |
| 2-26-14   | Tolls to/from Portchester                    | To pick up corn   | \$20.50      |
| 2-20-14   | Petchester Veterinary                        | Misc. drugs to  | \$676.13     |
|   |  | administer to deer  | \$198.86     |
| 3/1/14-   | Hampton Inns & Suites                        |   |              |
| 3/30/14   |  |   |              |
|   | Mayor Swiderski                              | Misc. Expenses (hotel,<br>dinner, signs etc.)                 | \$4,714.77   |
| 3/24/14   | The Science and                              | Shipping of PZP vaccine                                       | \$655.09     |
|   | Conservation Center                          |   |              |
| 4/1/14  | Irene Jong                                   | 50 Hostas(Valhalla<br>Garden)                                 | 300.00       |
| 4/10/14   | Ricky Eugene Naugle                          | Misc. Expenses (tags,<br>game feeder battery,<br>game feeder) | \$629.99     |
| 4/16/14   | Humane Society of U.S.                       | 25 sets PZP pellets   | \$5,650.00   |
| 6/26/14   | Humane Society of U.S.                       | Equipment & Supplies  | \$1,567.23   |
| 6/26/14   | Humane Society of U.S.                       | Kayla plane ticket  | \$423.50     |
| 6/26/14   | Humane Society of U.S.                       | Kayla's meals   | \$558.00     |
| 5/27/14   | In Defense of Animals                        | 1 <sup>st</sup> installment on grant                          | (\$6,000.00) |
|   |  | TOTAL -   | \$9,606.07   |