TOWN OF EAST HAMPTON

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Planning Department
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Director

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June 17, 2013

TO: Town Board

FROM: Marguerite Wolffsohn MW
Planning Director

RE: Aerial Infrared Deer Survey

Attached is a copy of the report prepared by Vision Air Research that describes the results of the aerial deer count that was completed for East Hampton on March 9, 2012. Also attached is a map prepared by the Town's GIS staff depicting locations of the deer groups that were spotted.

The Planning Department has reviewed the survey results with the NYS DEC Region 1 deer management staff and offers the following information to assist you in your review and understanding of the data collected by the survey.

The survey is not a census of all of the deer in East Hampton. A census is an exact count of every deer in the town. This is not possible. As noted in the report prepared by Vision Air Research, Inc., cover type influences the ability of the sensor to detect deer. Evergreen vegetation, branches, bud break and close proximity to some structures can affect the ability to detect deer. However, Vision Air also states that "meteorological conditions were good for flight safety and infrared surveys" during the night of our flyover.

Vision Air counted 877 deer in 381 groups throughout East Hampton. These are depicted on the attached map prepared by our GIS staff from the data points submitted by Vision Air. The map is divided into 8 "regions" determined by the clustering patterns of the deer groups. Also

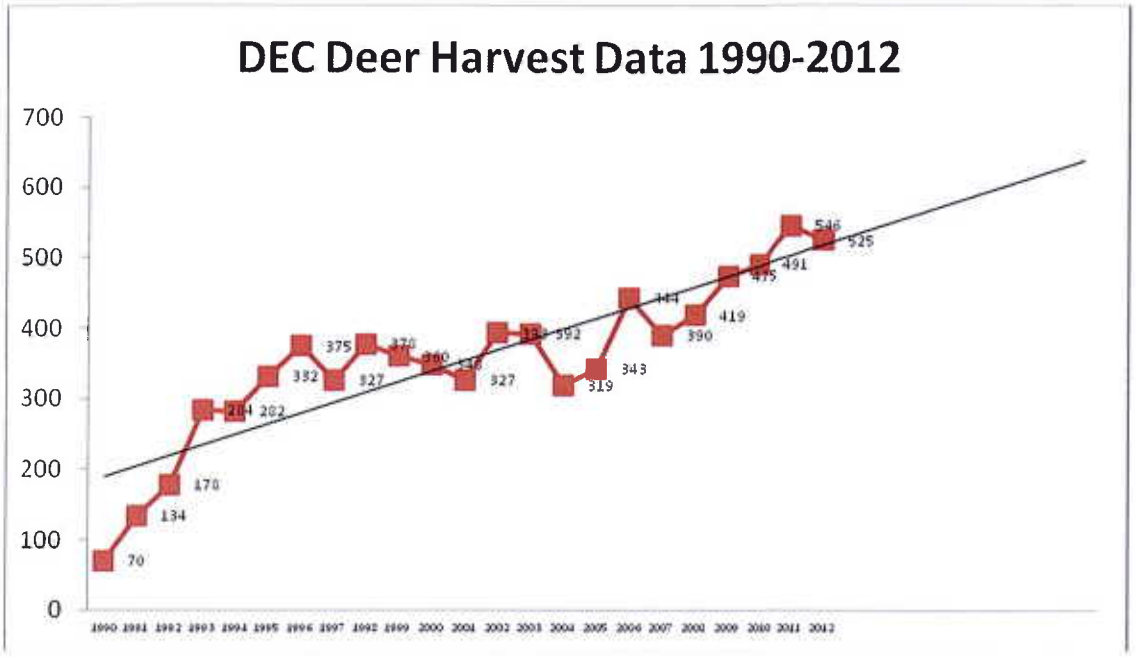
attached is a listing of the regions and a calculation of the number of deer per square mile that were counted in each region.
The pattern of deer observations is consistent with the observations of many people in East Hampton. Many deer were located within the residentially developed areas of the Town.

Through conversations with NYSDEC wildlife management personnel we understand that the mix of development and open space that we have encourages deer populations to rise by providing food (landscaping and direct feeding) and refuges from hunting.

The number of deer per square mile counted in the 8 town regions ranges from 6.9 to 23.6. Keep in mind that FLIR counts can provide lower numbers than the actual numbers of deer under certain conditions. Dr. Paul Curtis of Cornell University would predict our current deer density to be up to and in some areas exceed 100 deer/square mile. In order to protect biodiversity, the density should be less than 15 deer/square mile.

In 2006 the town's deer were surveyed using the roadside distance sampling method. This method involved an observer who rode in the bed of a pickup truck and located deer with spotlights along random road areas during 27 nights between March 11th and April 24th to provide a random sample of a portion of the total land area in the town. A mathematical calculation of 3,293 deer was then made using the samples collected.

These two methods of sampling deer populations cannot be compared, nor does the difference in number of deer observed indicate that our population has decreased. DEC staff note that the harvest in East Hampton has increased from 70 in 1990 to 525 in 2012. Comparing harvest data is one of the methods that the DEC uses to keep track of deer populations. The figure below depicts the total deer take in East Hampton between 1990 and 2012. The steady increase depicts a growing population.



Despite the results of the aerial infrared count we still need to reduce the deer population to restore our biodiversity, reduce deer/vehicle collisions and hopefully reduce the incidence of tick-borne diseases. Our next steps are:

- Adopt the Management Plan.
- Meet with State and Federal wildlife management professionals to refine our plan of action.
- Begin to implement the other aspects of the plan.

Deer Distribution Calculations

Region 1 – 157 deer in 18.4 mi^2 = 8.5/mi^2

Region 2 – 72 deer in 10.3 mi^2 = 6.9/mi^2

Region 3 – 308 deer in 18.0 mi^2 = 17.1/mi^2

Region 4 – 62 deer in 4.4 mi^2 = 14.0/mi^2

Region 5 – 123 deer in 6.2 mi^2 = 19.8/mi^2

Region 6 – 42 deer in 4.5 mi^2 = 9.3/mi^2

Region 7 – 90 deer in 3.9 mi^2 = 23.1/mi^2

Region 8 – 23 deer in 1.7 mi^2 = 13.6/mi^2

DOIT - B. MASIN - 6/13/13

Block Island Sound

Gardiners Bay

Napeague Bay

Atlantic Ocean

Cherry Hill Pt.
Cherry Harbor
Tobaccolot Bay
Great Pond
Hog Creek Pt.
Hog Creek
Kings Pt.
Cedar Pt.
Hedges Banks
Northwest Harbor
TOWN OF SHELTER ISLAND
Three Mile Harbor
Hands Cr.
Acabonac Harbor
Gerard Pt.
Louse Pt.
Barcelona Pt.
Sag Harbor Bay
Northwest Cr.
Barnes Landing
Alberts Landing
Fresh Pd
Cartwright Island
Cherry Pt.
Hicks Is.
Lazy Pt.
Napeague Harbor
Goff Pt.
Quincetree Landing
Rocky Pt.
Fort Pond Bay
Culloden Pt.
Gin Beach
Shagwong Pt.
False Pt.
Montauk Pt.
Turtle Cove
Oyster Pond
Lake Montauk
Caswells Pt.
Cottage Pt.
TOWN OF SOUTHAMPTON
Georgica Pd

1
2
3
4
5
6
7
8

Legend

Deer Distribution Points

- 1 Deer
- 2 Deer
- 3 - 4 Deer
- 5 - 6 Deer
- 7 - 14 Deer
- Tax Parcels
- Open Space Properties
- Region Boundaries

N

1 " = 1.57 miles

Miles

0 1 2

Basemaps: 2010 NYS Digital Ortho Photography

Suffolk County Real Property Tax Service
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Suffolk County Real Property Tax Service Agency (R.P.T.S.A.)

Date Prepared: June 13, 2013

Prepared By
THE TOWN OF EAST HAMPTON
Suffolk County, New York

Dept. of Information Technology

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TOWN OF EAST HAMPTON

Deer Distribution Points

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Aerial Infrared Imaging White - tailed Deer Count
East Hampton, NY

Submitted to:

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Planning Department
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Via email: MWolffson@EHamptonNY.gov

Submitted by:

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May 28, 2013

East Hampton, NY, retained Vision Air Research to conduct a deer survey. The project goal was to provide a count of the deer for information on distribution and abundance. The aerial infrared survey maps group locations, and provides a tally of deer observed.

Study Area

The study area encompasses the eastern end of Long Island, NY. The western boundary was a north – south lines running from the towns of East Hampton and Sag Harbor. This is a residential area dominated by houses, other buildings, recreational fields, open parks, and hardwood and mixed forests. There are large areas of parks and mixed forests.

Methods

The survey was conducted March 9, 2013 between 1400 and 2300 hours. Flight line transects were established running roughly east – west and parallel to the coastline. Transects were spaced 800 ft apart and flown at 1,000 ft above ground level. The sensor look angle was approximately 45° elevation. The sensor was aimed to gain more oblique or vertical look angle. Wide field of view was used to search for the deer while the narrow field of view was used to verify the object, as needed. Portion of the flight along transects were recorded to on onboard computer. The pilot and sensor operator communicated to verify the location of the boundaries at the start and end of transects.

The video was reviewed by playing the video backward and forward and in slow motion and frame by frame as needed to identify deer group and count within the group, and map group location. Deer were located by observing their level of emitted infrared energy versus background levels. Video editing and image extraction was not conducted. The video was collected for population counts by a skilled thermographer not for entertainment or educational purposes.

Duplicates or repeat groups were identified. Groups were mapped at their approximate observed position. I performed an additional check of the data through sampling the videotape for detection verification, and checking for duplicate groups. Orthophoto quadrangles were used as the base layer, which provided vegetation cover type to assist in mapping group locations. Group mapping locations are approximate.

Equipment

We used a forward – looking infrared (FLIR) by PolyTech Kelvin 350 II (Sweden) mounted on the left wing of a Cessna 206 "Stationair". The sensor gimbal allows 330° of azimuth and 90° of elevation allowing us to look in all directions except directly behind the airplane. The infrared sensor installed in the gimbal is the high resolution Agema Thermovision 1000, which is a long wave system (8-12 micron). It has 800 by 400 pixels providing good resolution with the ability to determine animals by their morphology or body shape. The thermal delta is less than 1° C, which means it can detect objects with less than 1° C

different than the background. There are 2 fields of view (FOV): wide (20 ^{o}) and narrow (5°). At 1,000 ft. above ground level looking straight down using the wide FOV the footprint or area covered by the sensor is 360 ft. x 234 ft. while the narrow FOV provides a footprint 90 ft. x 59 ft. The sensor operator / wildlife biologist sat in the rear seat and watched a high resolution 15 in. monitor to aim and focus sensor.

Results

The meteorological conditions were good for flight safety and infrared surveys. Image clarity was good (Figure 1). Locations of deer groups were plotted and the total number in each group was tallied. A total of 877 deer were found in 381 deer groups (Appendix A). Deer group size ranged from 1 – 13 individuals. Most were in groups of 2 – 3 deer.

Detection Potential

Cover type influences the availability of the deer to be detected by the sensor. A dense canopy will make it more difficult to detect the deer since infrared doesn't see through vegetation. Research I've conducted to determine detection rates have been based on

Figure 1. Infrared image clarity was very good during the FLIR survey by Vision Air Research in the East Hampton, NY survey area, March 9, 2013.

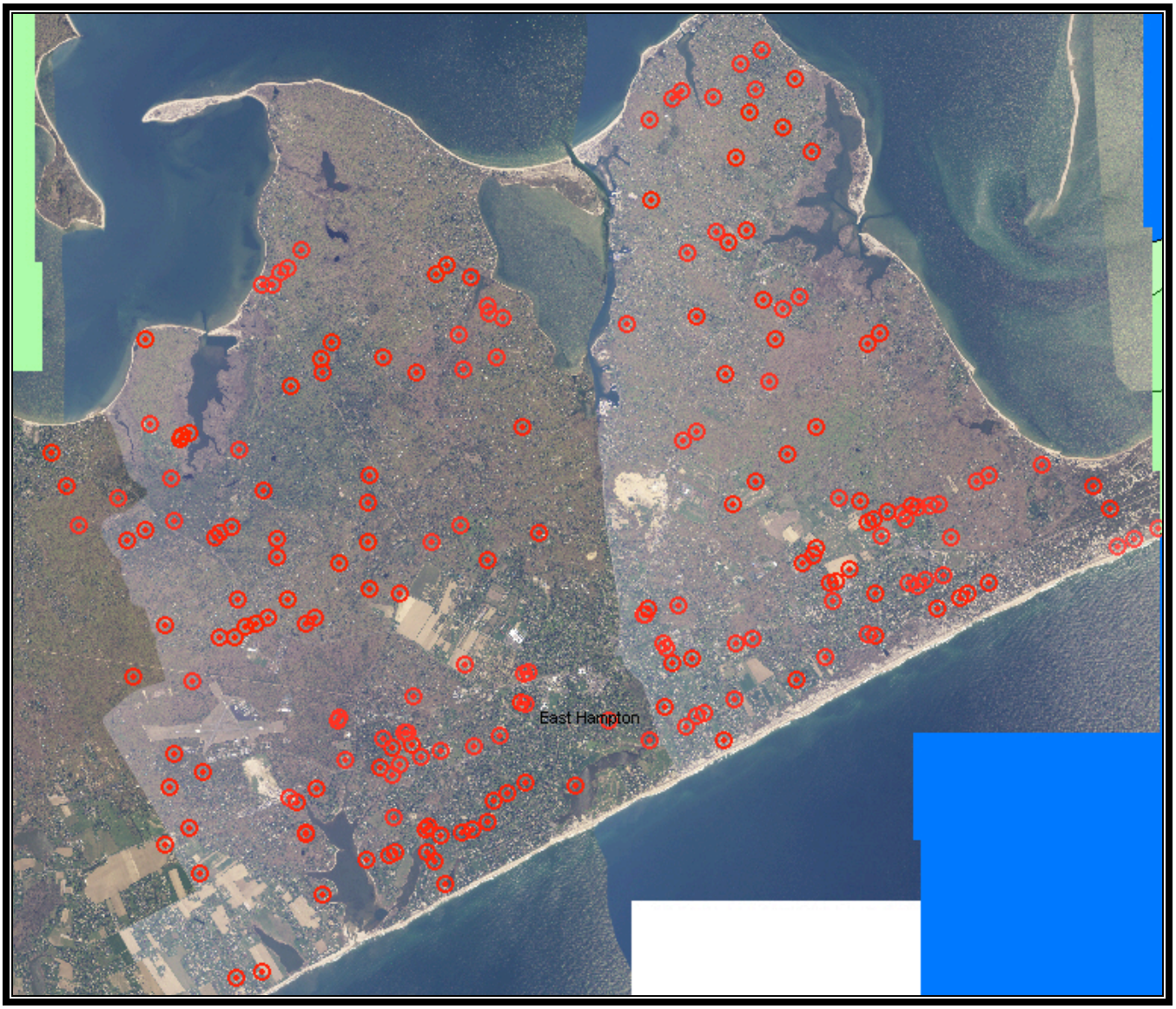
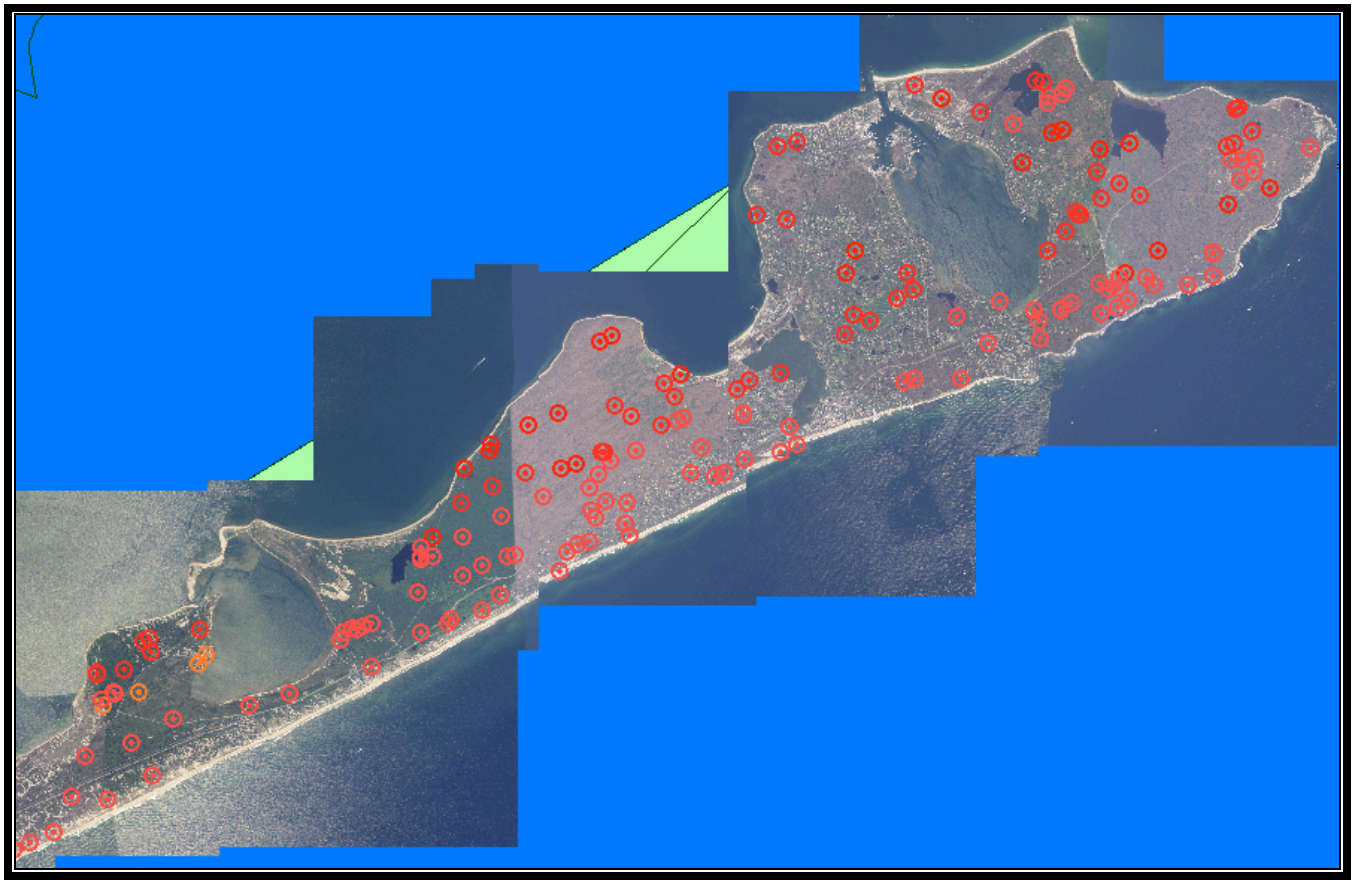
known target subjects. One or more individuals in a group had radio collars. The location of the target subject was monitored by a second aircrew in another airplane or via ground based crews to avoid any detection bias. These controls allowed me to determine if the individual or groups were detected, were available to be detected and subsequently missed, or unavailable to be detected because they were no longer in the search area. In areas where no collared animals were available, previously detected animals were used as targets in subsequent replicates. This is similar to a mark – recapture method for determining detection. These efforts have revealed a consistency as to which variables influence detection. The vegetation cover type is the primary variable to confound detection rates. Infrared cannot detect or "see" through a canopy cover. As such, evergreen species can thwart detection. Branches and tree boles can also influence detection based on the size of the animal (Figure 2). Cloud cover can enhance detection. Ambient temperatures do not influence detection unless it changes the subject animals habitat use or behavior. The temperatures during this survey were not unusual and no changes were expected.

Figure 2. The deer can be seen within the conifer canopy. Conife decreases detection rates because IR doesn't see through anything. It does provide increased contrast for increased detection over human vision.

The multiple look angles provided by an oblique angle and the ability to aim and focus increases detection. Video capture instead of still images provides a dynamic view of the landscape.

Detection rates for open areas such as parks and meadow can be 100% (Figure 3), deciduous forests were roughly 86%, and conifer can range from 50 – 80% or less depending on the canopy closure. What was not obvious was the effect of bud break on detection. Although the deer, for example, could be seen visually through tree branches during bud break, the deer can be masked by the energy given off by the bud break. Buds effectively "glow" masking deer behind the canopy. Bud break may have diminished detection under some tree species and shrubs but it did not appear to be widespread during this survey.

All wildlife surveys are a snapshot in time whether they conducted from the air or ground. This survey can provide a good index or baseline for density and distribution of deer within the community.

Figure 3. The deer in a meadow or lawns are easier to detect than the deer in the shrubs or trees.

Appendix A : A total of 877 deer were located in 381 groups within the East Hampton project area during the aerial infrared deer survey conducted by Vision Air Research on March 9, 2013. Deer groups are shown in red icons. Deer locations are approximate. A shapefile has been provided for import into the communities' GIS.