Dealing with Deer in Suburban Landscapes

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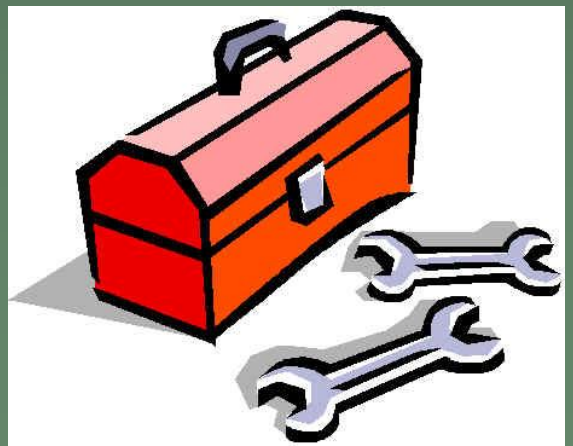
Problems Caused by Deer Overpopulation

Deer Management Toolbox

No Population Control

- Hands-off
- Damage control
  - repellents
  - fencing
- Feeding illegal



Population Control

Lethal methods

- Predator introduction
- Capture and kill
- Bait and shoot
- Traditional hunting
- Controlled hunting
- Commercial hunting??

Non-lethal methods

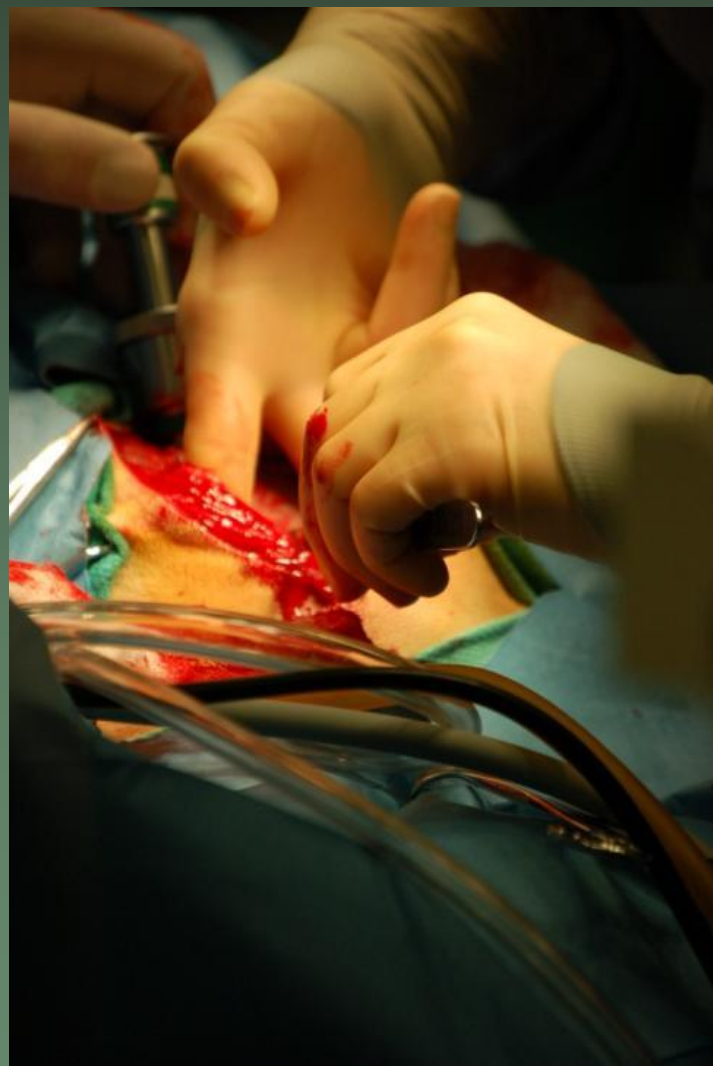
- Habitat alteration
- Capture and relocation
- Fertility control
  - transient
  - permanent

Deer Population Management

- Fertility control
- Bait and shoot
- Managed hunting
  - DMPs
  - DMAP
  - DDPs
  - -- DMFA (2012-14)

Fertility Control

- Experimental
- Theoretically possible
  - Rose petal hypothesis
- Unproven in the field
  - Biologically feasible?
  - Economically practical?
- Females only
- Limited scale
- Maintenance required



Seneca Depot Fawning 1998

Treatment	Females with Fawns	Total No. Fawns	Fawns/ Doe
GnRH	13% (n=4/30)	4	0.13
PZP	14% (n=3/22)	3	0.14
Control	85% (n=23/27)	33	1.22

Seneca Depot Fawning 1999

Treatment	Females with Fawns	Total No. Fawns	Fawns/ Doe
GnRH	29% (n=8/28)	10	0.36
PZP	10% (n=2/20)	2	0.10
Control	88% (n=14/16)	22	1.38

Seneca Depot Fawning 2000

Treatment	Females with Fawns	Total No. Fawns	Fawns/ Doe
GnRH	57% (n=16/28)	17	0.61
PZP	28% (n=5/18)	5	0.28
Control	85% (n=11/13)	17	1.31

Summary

- Both IC vaccines effectively inhibit deer reproduction (85-90% efficacy)
- Very costly using field protocols for vaccine administration
- Nearly impossible to keep free-ranging deer on a booster schedule
- Long-term costs likely more expensive than surgical sterilization

Blacklegged (‘Deer’) Tick

Ixodes scapularis

Nymph

Male and female

Larva

Managing Lyme Disease

- Direct reductions in deer densities (??)
- Fencing to exclude deer from areas
- Self-application of acaricides to deer via feeding stations (SLN registration only on LI)

Lone Star Ticks on Deer

Pathogens, Hosts, Vectors, Reservoirs

Pathogen	Disease	Tick Vector	Reservoir
E. chaffeensis	HME **(Erlichiosis)**	Lone star	deer
A. phagocytophilum	HGE **(Anaplasmosis)**	BL, Am. dog	deer, small mammals (w-f mouse)
B. burgdorferi	**Lyme** (Borreliosis)	BL	rodents
B. microti	**Babesiosis**	BL	w-f mouse, rodents
Bartonella spp.	**Bartonella**	BL?	rodents, cats, cattle, dogs

Clin Microbiol Rev. 2000 Jul;13(3):428-38
Emerging Inf. Diseases CDC Mar 2010 16(3)
J Clin Microbiol ,Aug.1992,p.2097-2103
http://pathmicro.med.sc.edu/book/welcome.htm

BL = blacklegged (deer) tick

The Long Island 4-Poster Deer and Tick Study

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Cornell Coop. Extension of Suffolk County

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Cornell University


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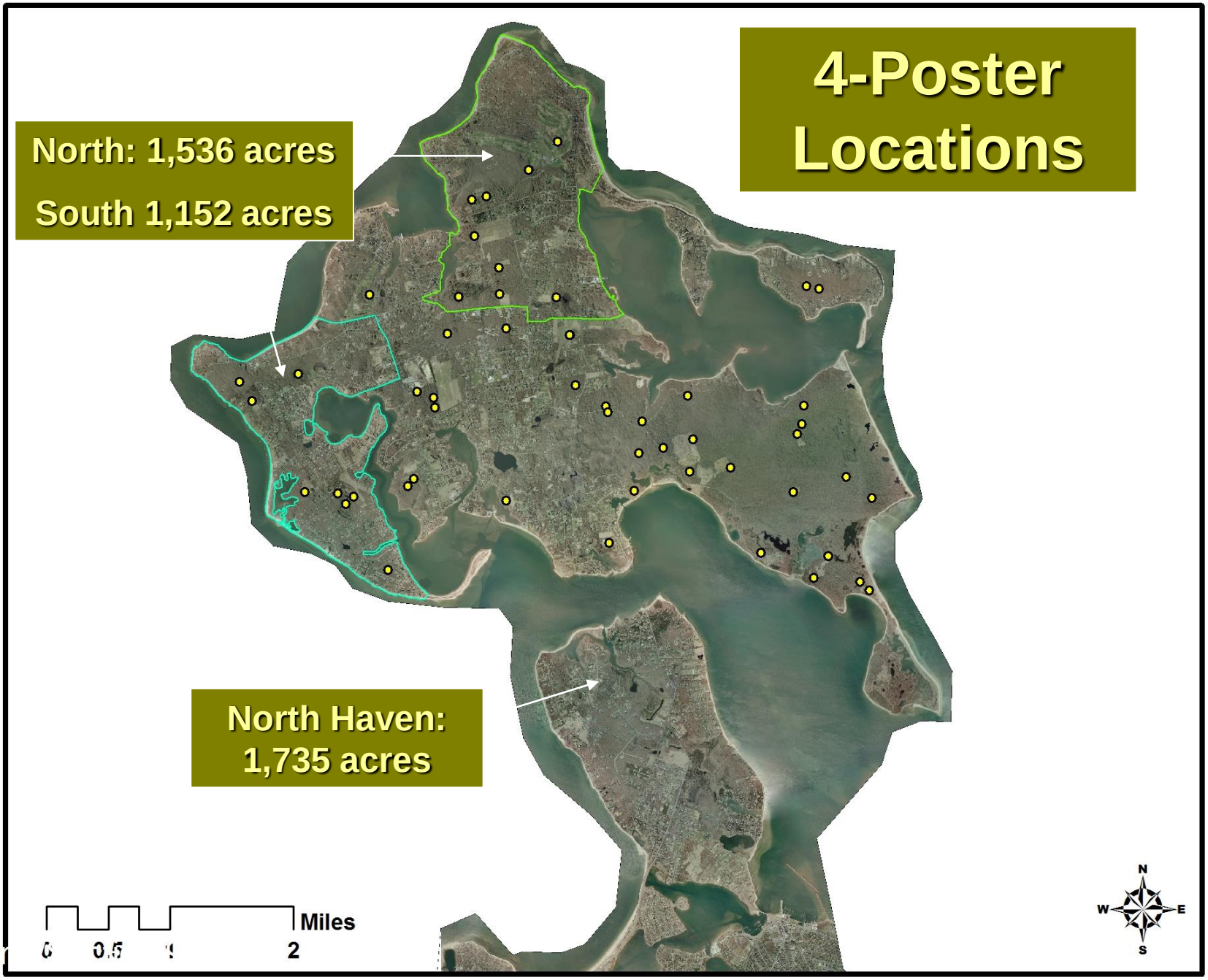
4-Poster Locations



Deer Live-trapping & Marking

Treatment:
Shelter Island

Control:
North Haven

Males and females are ear-tagged

Only large, adult does are collared

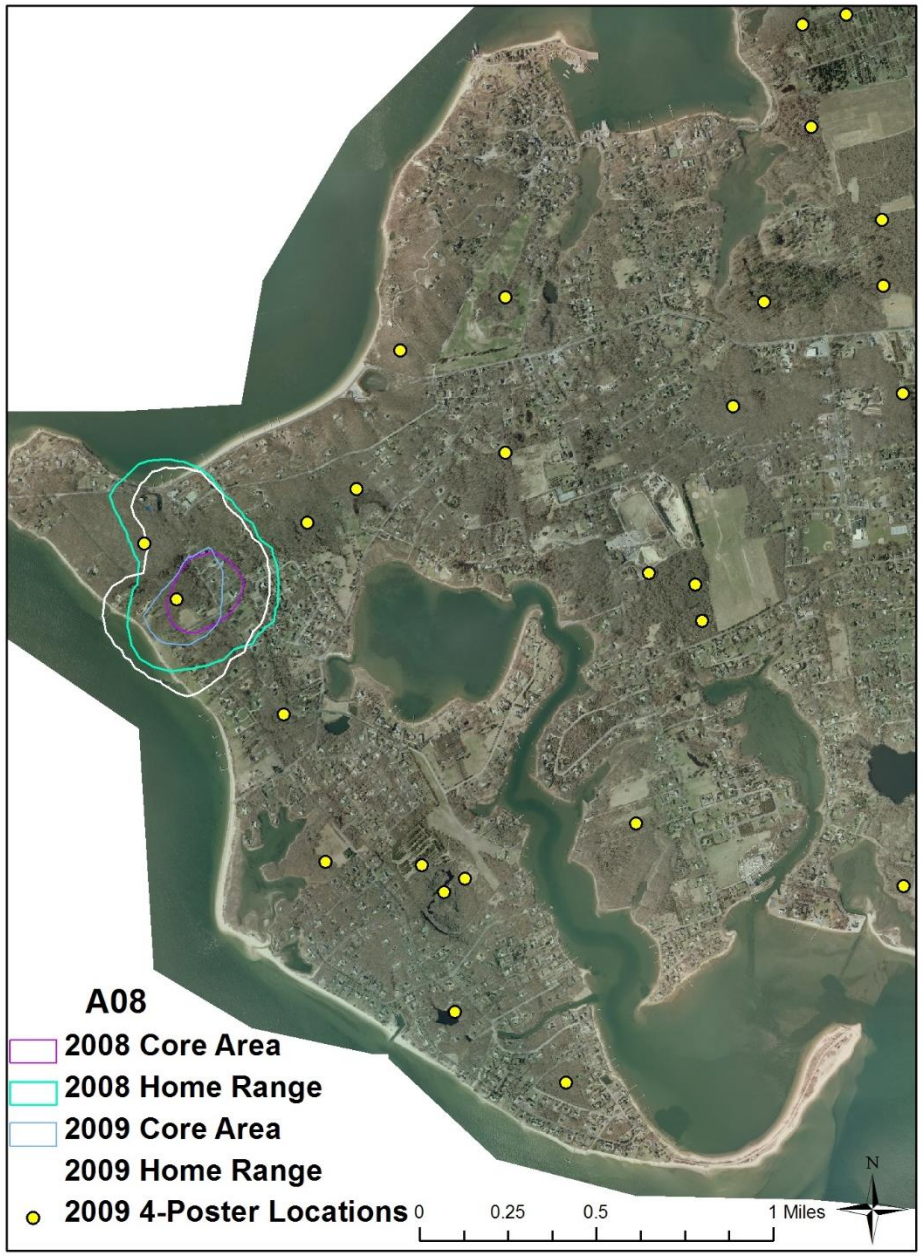
Radio-Collars

GPS and VHF radio-transmitter collars

Does 4-Poster tick control technology influence deer behavior and movement?

- 97 deer tagged on SI
  - 17 GPS collars
  - 15 VHF collars
- 41 tagged on NH
  - 11 GPS collars
  - 7 VHF collars

Shelter Island: 4-Poster



North Haven: No Bait

Deer Movement & Effective Treatment

Shelter Island

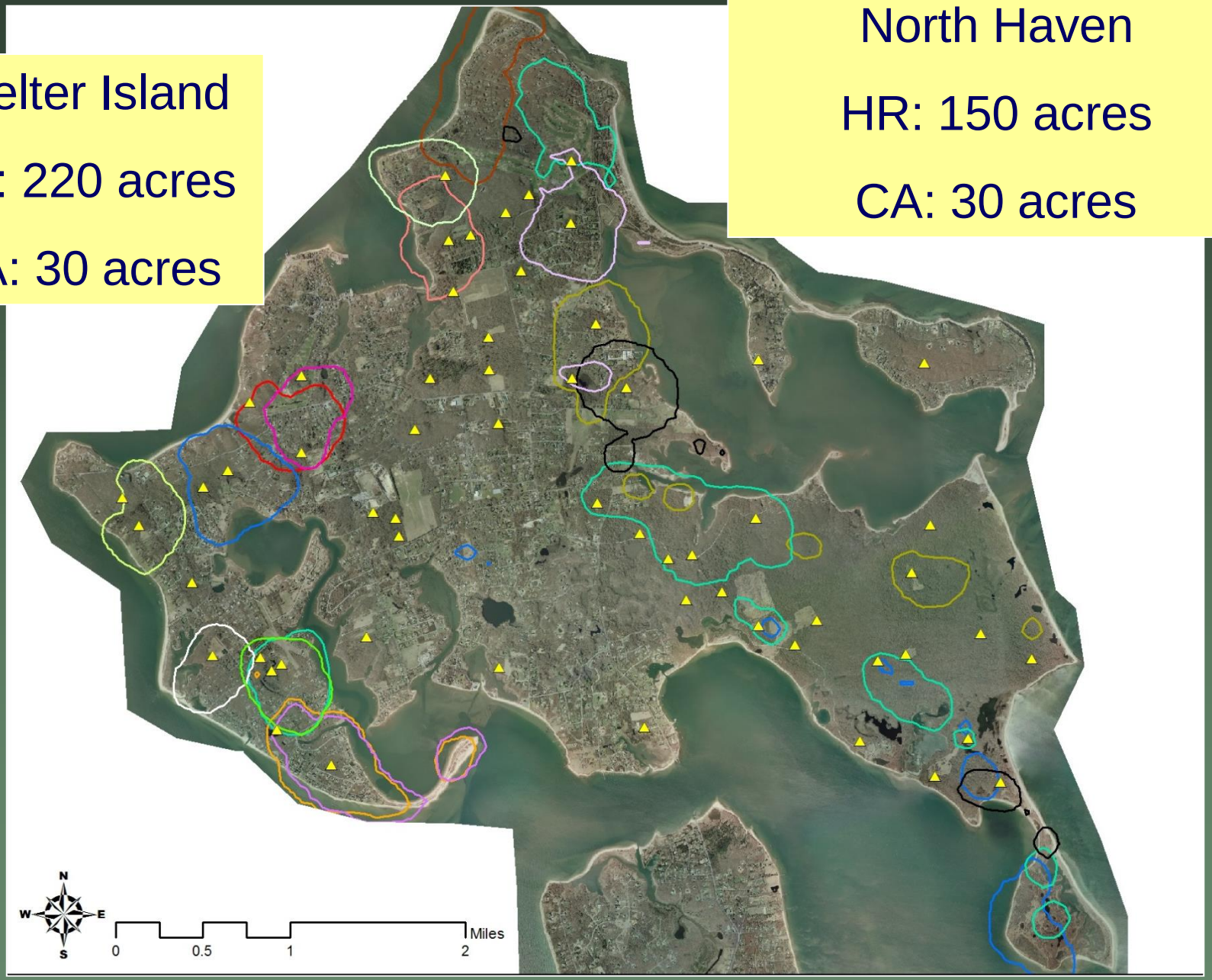
HR: 220 acres

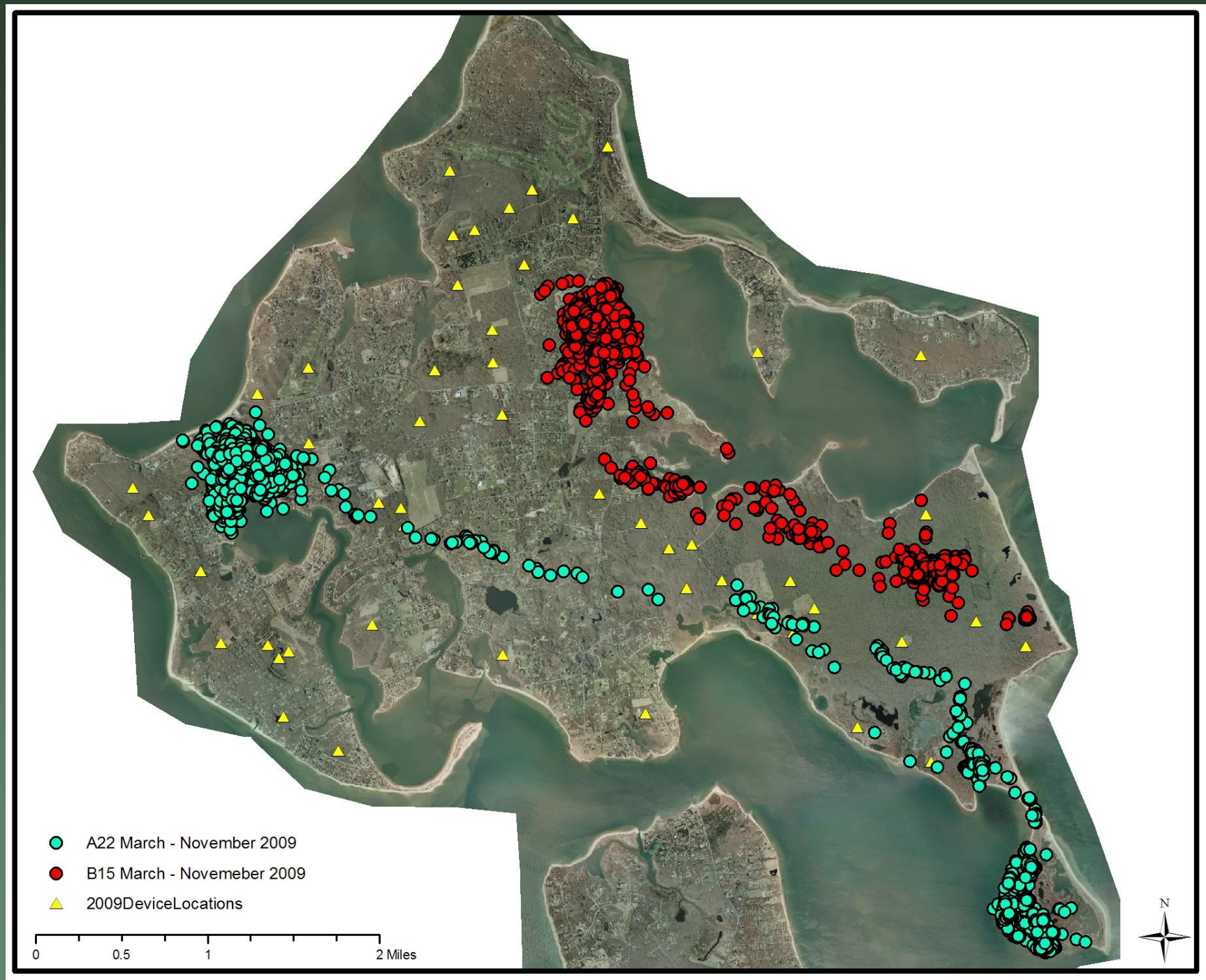
CA: 30 acres

North Haven

HR: 150 acres

CA: 30 acres



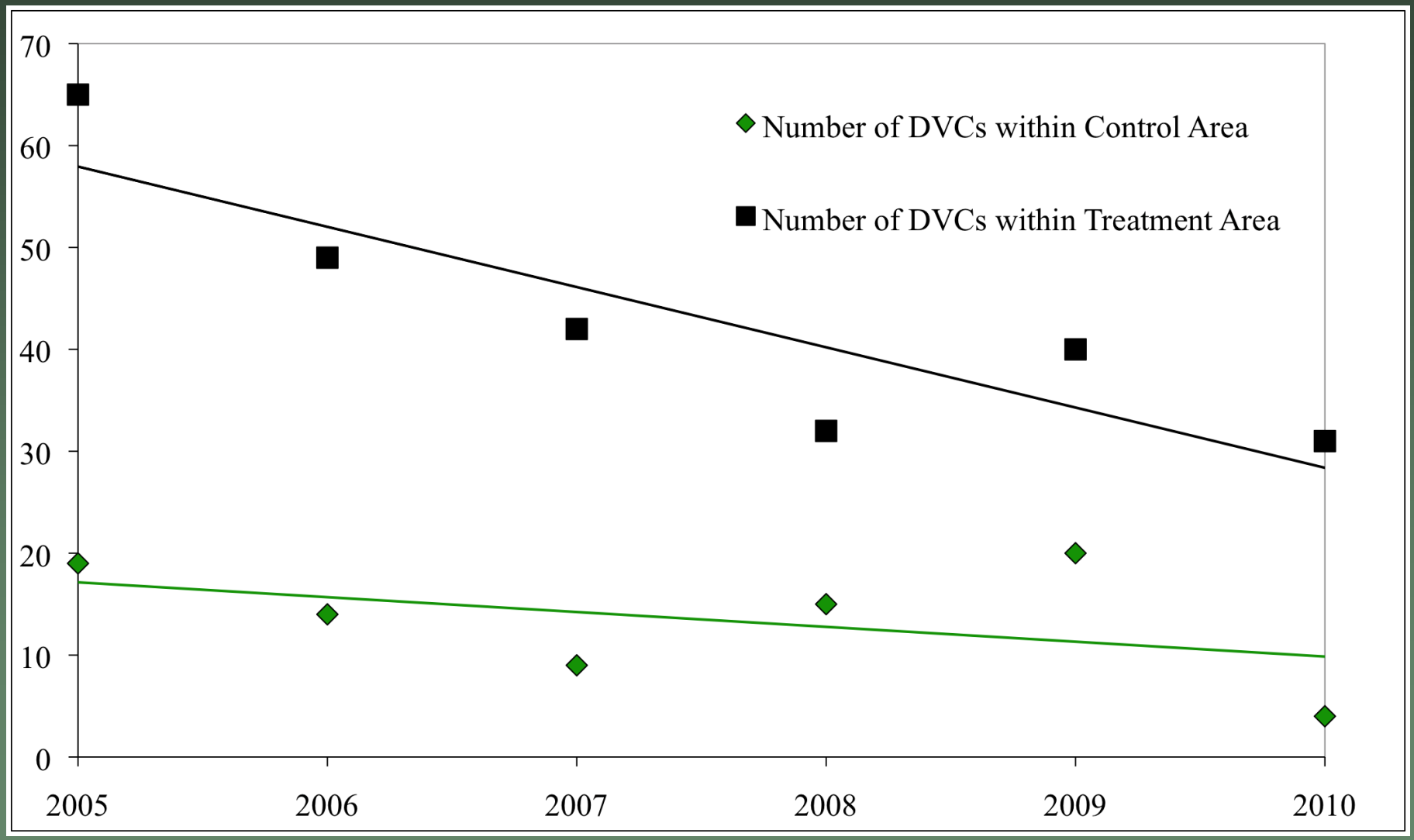

A22 March - November 2009
B15 March - Novemeber 2009
2009DeviceLocations
0
0.5
1
2 Miles
N

Wildlife Use of 4-Posters

- Deer, raccoons use 4-Posters most
- Both contact rollers
- Squirrels, birds, other animals also use devices

Deer-Vehicle Collisions:

No apparent effect from 4-Posters

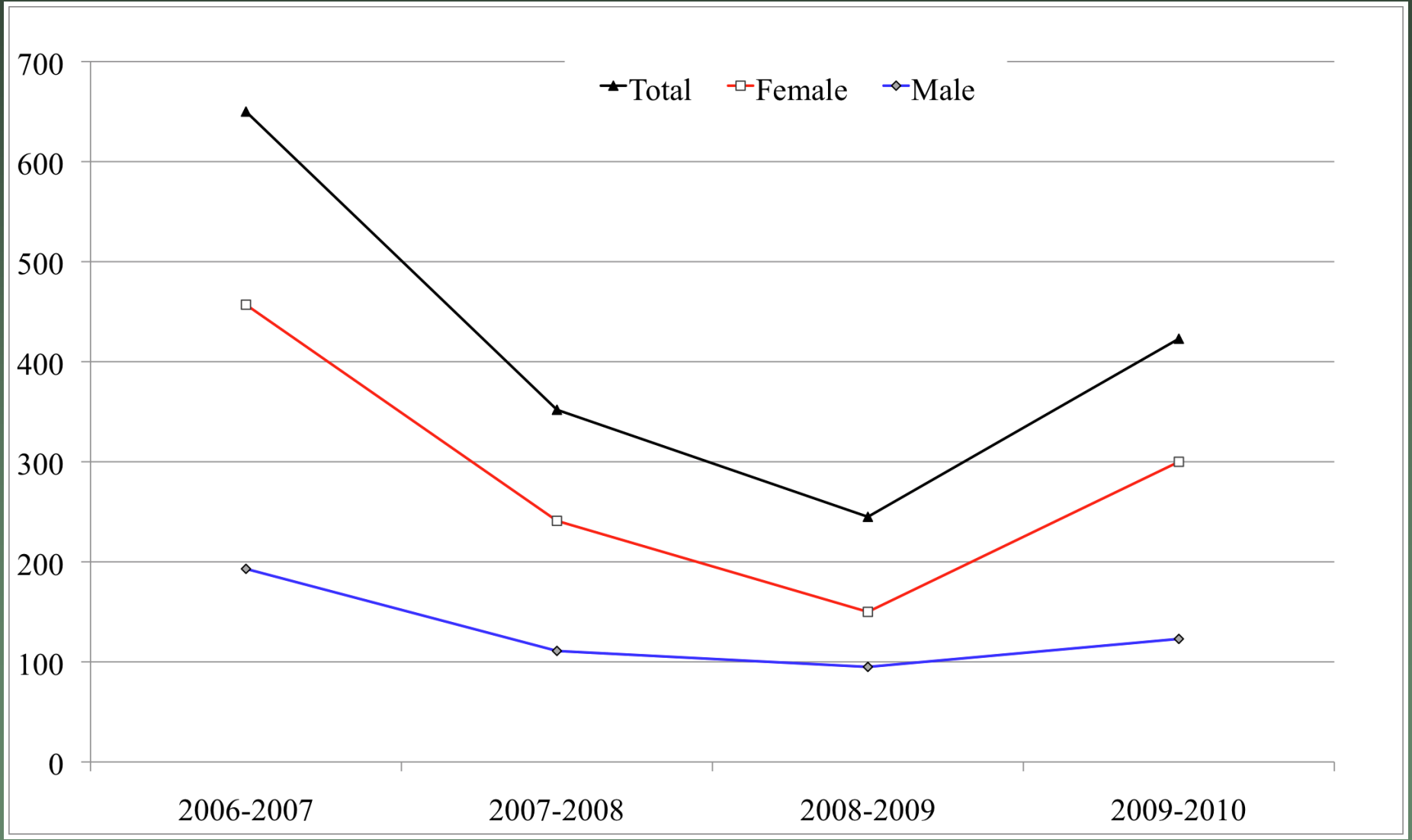


Deer Population Numbers, Reproductive Success, and Mortality Rates

- 34% mortality on SI and 9% on NH 2008 – 2010
- Average 1 fawn per doe each study year
- 4-Posters appear to have little/no direct impact on reproductive success or survival
- Impact on population growth?

Deer Harvested Shelter Island

Total number deer harvested per year, nuisance and regular hunting



Permethrin Residue Investigations
39 deer on SI, 15 deer from NH

Sample	Shelter Island	North Haven
Coat Swab (mcg)	ND – 5,296	ND – 0.27
Neck Muscle (ppb)	ND – 270 (2008) ND (2009) ND – 27.8 (2010)	No Detections
Hindquarter Muscle	No Detections	No Detections
Liver (ppb)	No Detections	No Detections

Concerns:

- Dermal exposure
- Consumption

How Effective Are 4-Posters?

- Wear boots and/or ‘tick gaiter’

- Use permethrin-based repellent

- Check for ticks every evening

Percent Change in Tick Levels 2008 – 2011

	Lone Star Male	Lone Star Female	Lone Star Nymph	Blacklegged Nymph
SI South	-87	-91	-90	-67
SI North	-89	-90	-85	-45
N Haven (control)	-43	-57	21	0
Fire Is	-48	-25	-85	-70

*no significant effect due to distance from device

Protecting Yourself

- Learn what to expect – what ticks, when, where
- Use repellent
- Check for ticks after being outdoors
- Dry clothing 1 hour high heat
- Exclude deer/hosts (fencing)
- Landscape treatments
- Tick ID if suspect
- Consult physician if needed
- Pets: labeled repellent/treatment per vet

Cornell University Integrated Deer Research and Management Program

Paul Curtis, Jay Boulanger, Mike Ashdown, and Bernd Blossey

Cornell University

Department of Environmental Conservation · New York State ·

Cornell University College of Veterinary Medicine

Northeast WDM Cooperative

USGS science for a changing world

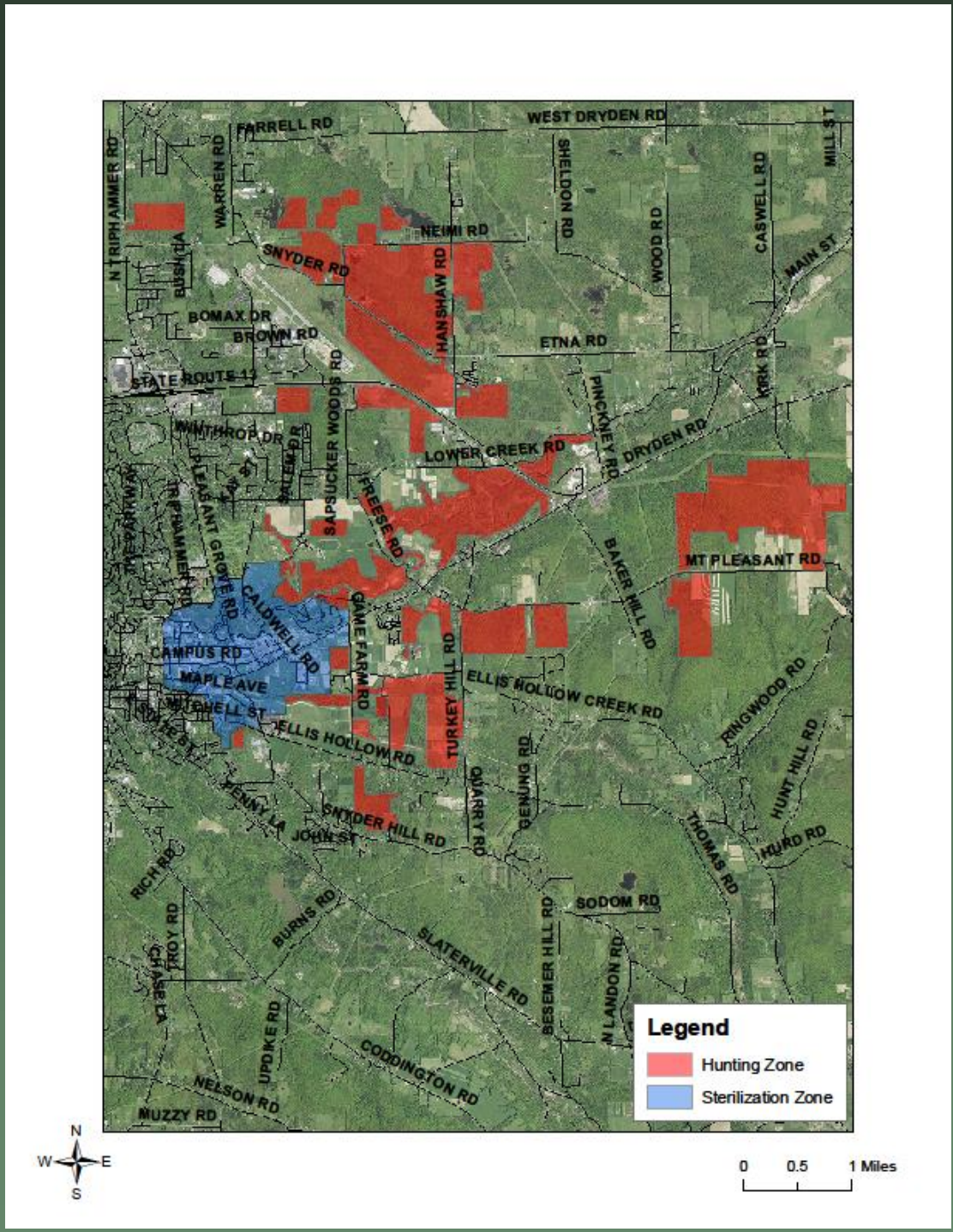
University Deer Task Force

- **Integrated Deer Research and Management Program**

- **Objectives**
  - **Protect key areas of the campus**
  - **Limit deer damage**
  - **Minimize collateral impacts**
  - **Consider short term approaches**
  - **75% reduction in 5 years**

Cornell's Novel Approach:

- Surgical sterilization combined with controlled hunting
- 10-year program



Core Campus 446 ha (1,103 acres)

- Fertility control research
- Fencing for sensitive plots
- Goal: 75% reduction in deer abundance and associated impacts within 5 years

Capturing and Marking

- Clover traps, dart rifles, drop nets
  - Ear tags
  - Radio collars

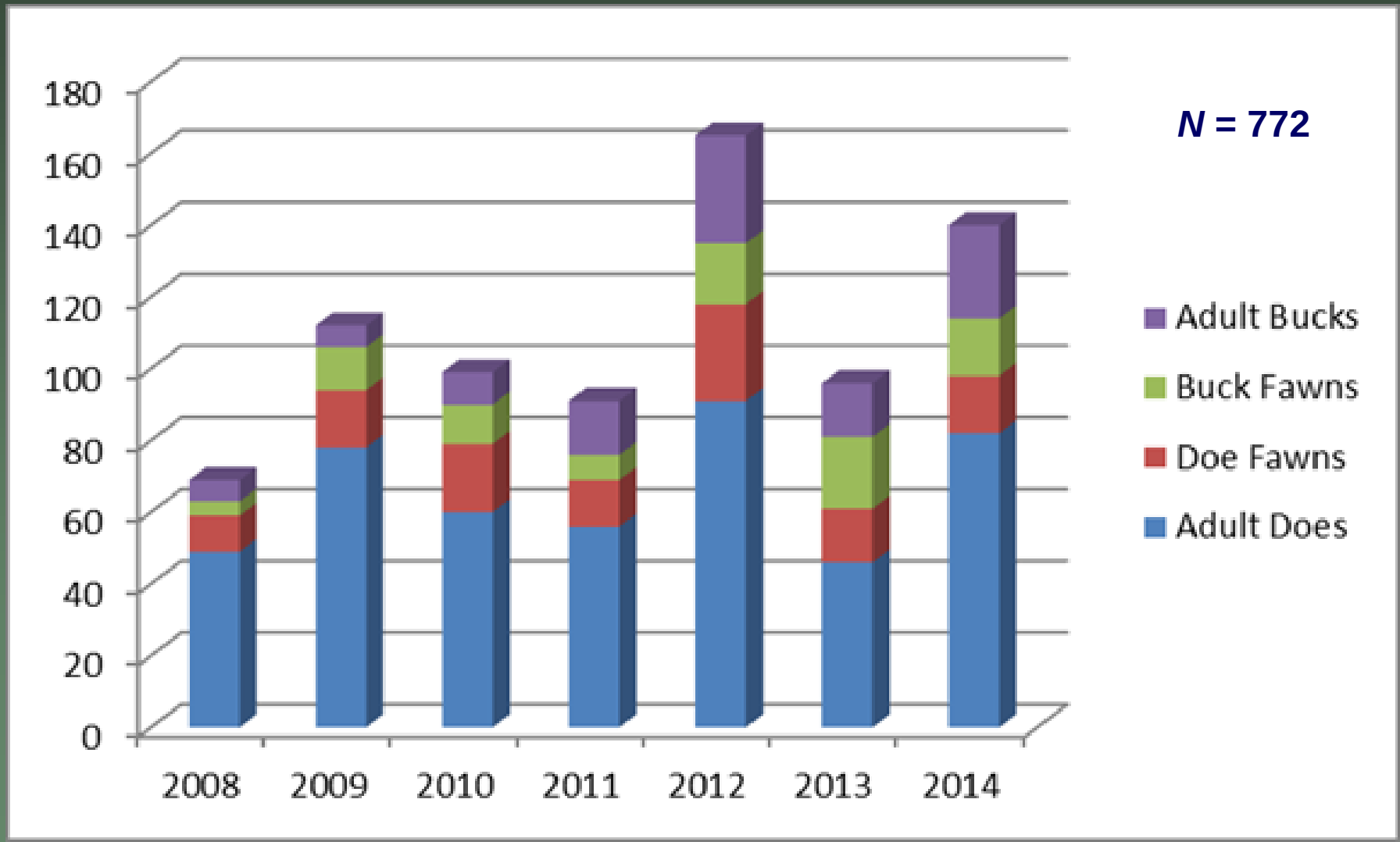
2007–2013 Surgery Results

- 93 surgeries (90-95%; 77 adults & 16 fawns)
- 26 marked, unsterilized control does

- Mortality (*n* = 82)
  - 32 motor vehicle
  - 36 hunter harvest
  - 6 other
  - 4 capture-related
  - 4 unknown

  - 31 deer still alive

Harvest Results



Harvest Results

	2008	2009	2010	2011	2012*	2013*	2014*
Active hunters	97	187	198	195	538	405	581
Bucks harvested	6	5	9	15	30	15	26
Avg. hours hunted per deer	49	61	51	64	85	88	82
% of successful hunters	38%	25%	27%	28%	18%	19%	17%





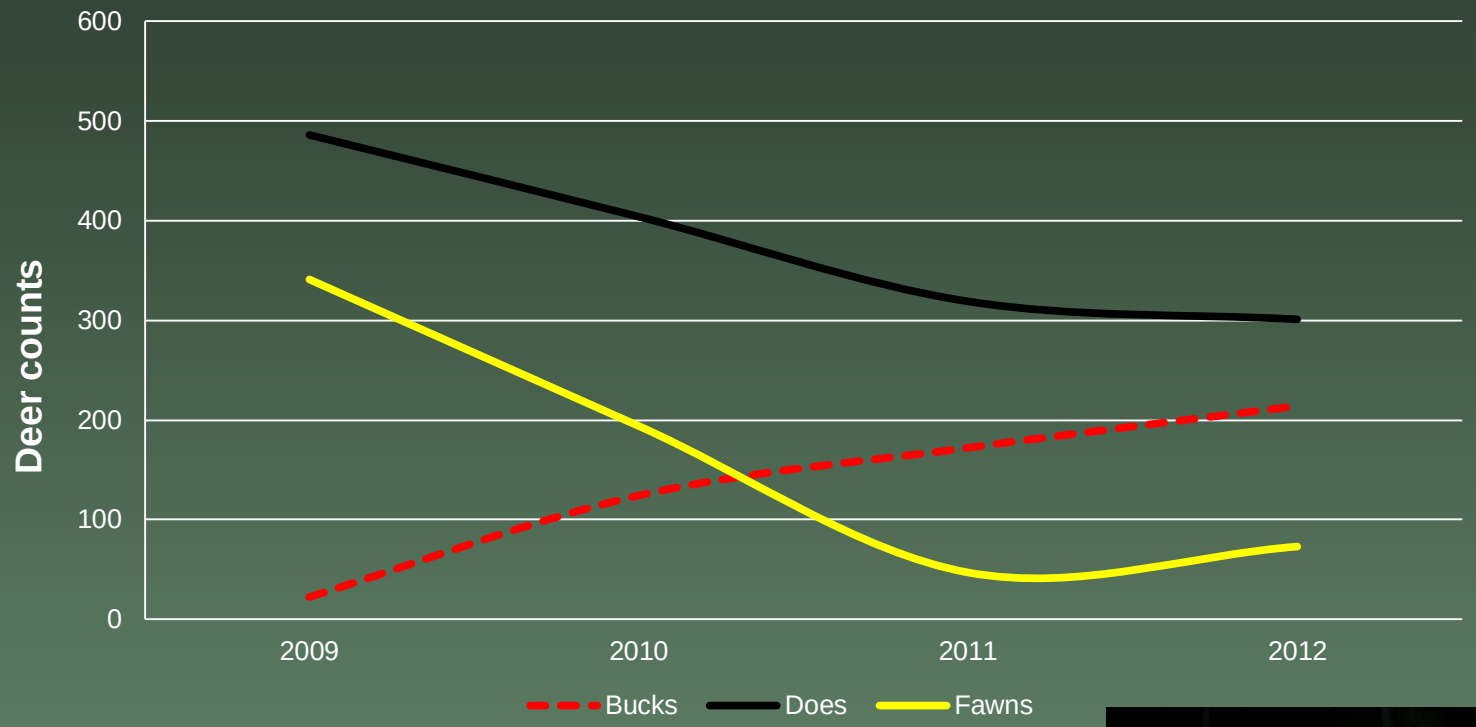
Population Estimation

- **Sterilization Zone**
  - **Mark-recapture camera survey**
  - **Baited stations**
  - **Infrared-triggered cameras**

Camera Survey

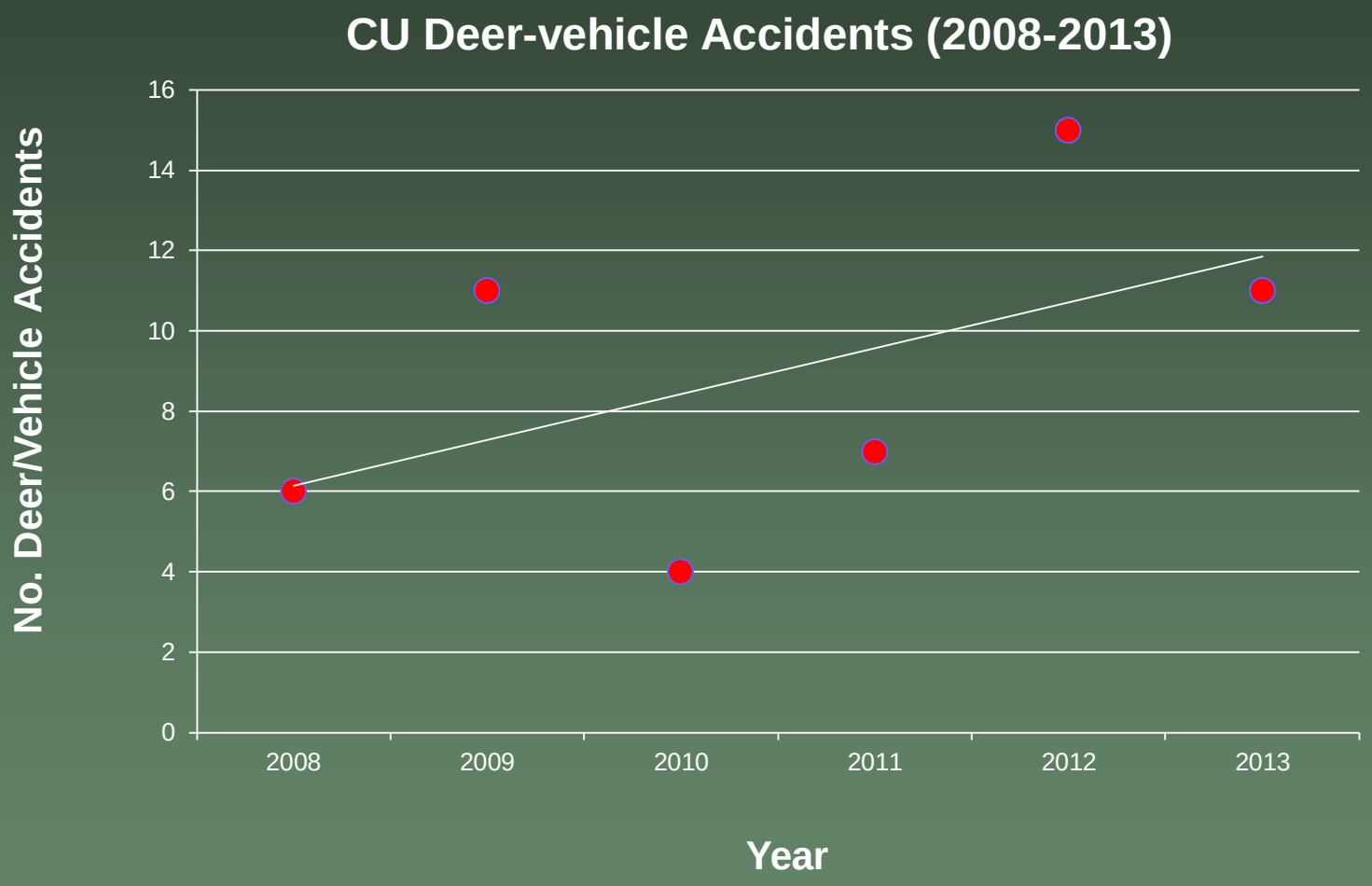
Year	Bucks	Does	Fawns
2009	22	486	341
2010	124	404	194
2011	172	319	47
2012	214	301	73

Collateral Impacts



X^2 = 434.0, P < 0.01

Impact Assessment

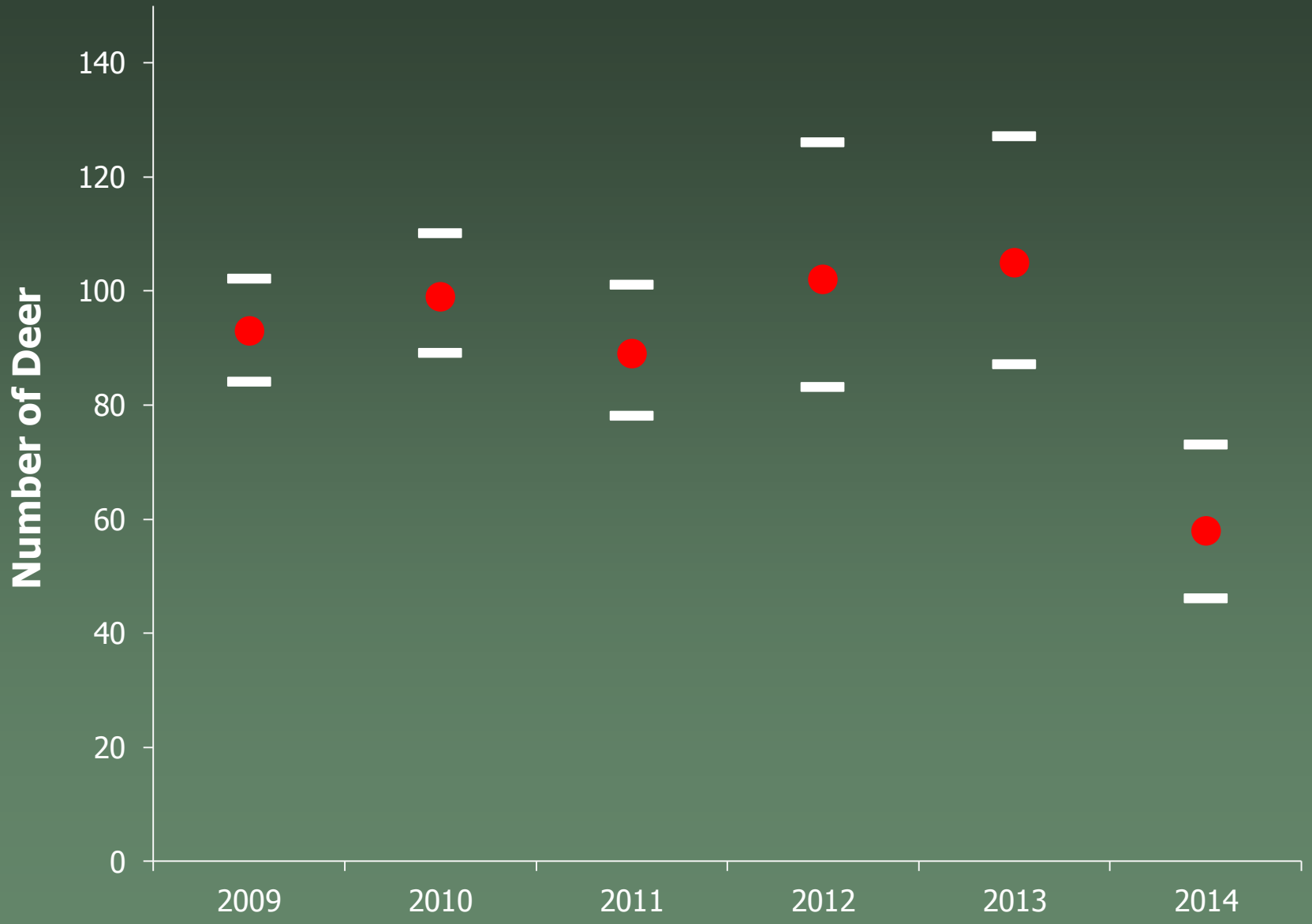



Cornell Golf Course
Unbrowsed Surviving Seedlings
25
20
15
10
5
0
0
20
40
60
80
100
Days Since Planting
Exclosed
Open

DEC Deer Damage Permit

- Provides access to deer in non-hunting areas
- Shooter screening and selection
- Antlerless deer only
- Used bait to attract deer
- Used lights for shooting until 11 PM
- Used bows and crossbows on campus
- ECL-mandated discharge distance
- Limit based on number of tags issued
- Report to NYSDEC
- Took 34 deer in 2013-14, most at night
- 8 additional deer taken on a research permit (LCP)

Population Estimation



Urban Deer Management Challenges

- Cost
- Safety
- Public values
- Communication
- Access to deer
- Discharge distances
- Setting reasonable goals
- Interacting with police agencies

Community Recommendations

- Develop assessments so the effectiveness of management approaches can be validated.
- Avoid nonlethal methods, as they have shown little promise in areas where deer can move freely.
- Develop local expertise on deer management.
- Community support for the program will be essential.
- Once started, some form of deer management will need to be maintained for the foreseeable future.

The Next 5 Years:

Same program objectives, but…

- **Continue use of DEC deer damage permits**
- **Move closer to campus buildings with lower bow discharge distances (150 feet)**
- **Campus-wide deer hunting reservation system**
- **Evaluate deer impact indicators**

The future???