Natural Resources Update

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January 9, 2014

BROOKHAVEN NATIONAL LABORATORY

a passion for discovery

Office of Science
U.S. DEPARTMENT OF ENERGY

Natural Resources Update

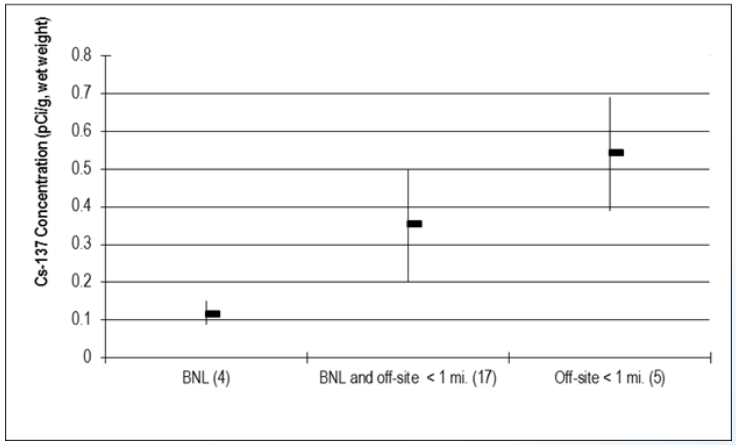
Tonight's Agenda

- 2012 Site Environmental Report – flora and fauna
- Deer
  - Status of deer management
  - Status of 4-Poster
- Long Island Solar Farm research
- Long Island bats

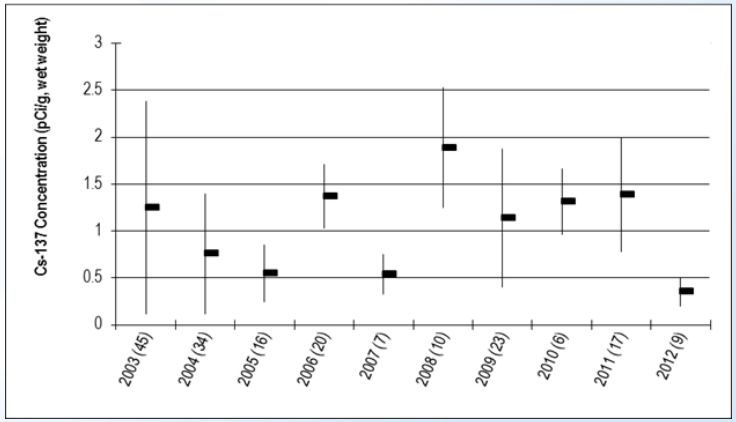
2012 SER Chapter 6 – flora & fauna monitoring

- **Deer Sampling**
  - 4 on-site, 5 off-site samples (none greater than 1 mile from BNL)
  - Cs-137 average for on site (0.12 pCi/g, wet weight) is lower than average within 1 mile of the Laboratory (0.54 pCi/g, wet weight)
  - Highest sample value was 1.52 pCi/g, wet weight, from sample taken on the William Floyd Parkway
  - Ten-year trend for on and near off-site samples indicate stabilizing trend with average values less than 2.0 pCi/g,wet weight; 10 year average 1.05 pCi/g, wet weight
  - Bone samples analyzed for Sr-90 indicate background levels, 2012 is last year for Sr-90 testing of bone
- **Other Wildlife**
  - Two turkeys tested, 0.03 and 0.20 pCi/g, wet weight, respectively for Cs-137
  - Single goose tested with a non-detect for Cs-137

Average by Sampling Group

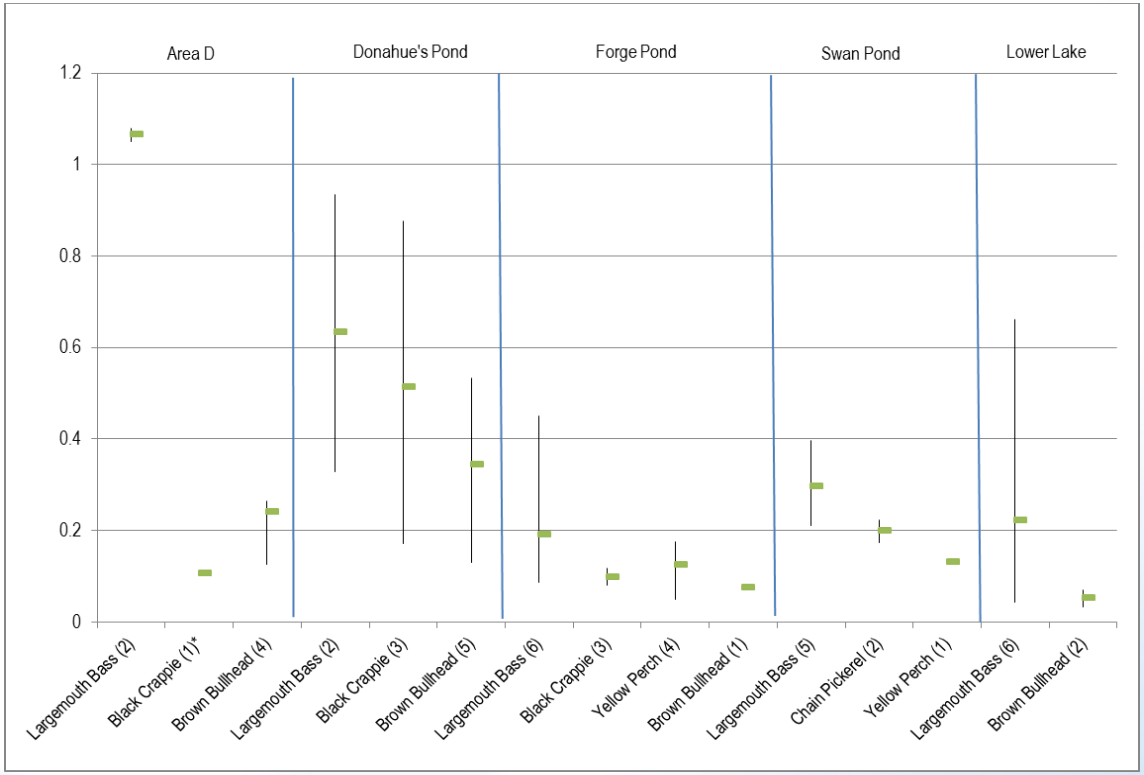


Long-term Trend in Cs-137 Average On and Near Off-site Sampling



Chapter 6 – Flora and Fauna Monitoring (continued)

- **Fish Sampling - Surveillance**
  - On- and off-site fish sampling indicated low levels of Cs-137 (<0.30 pCi/g, wet weight) consistent with previous years
  - Mercury (max value 1.08 mg/kg in a Largemouth Bass from on site Area D)



2012 Mercury content in Peconic River and Carmans River fish (average, maximum, and minimum values in mg/kg)

Chapter 6 – Flora and Fauna Monitoring (continued)

- **Aquatic Sampling - Surveillance**
  - On-site aquatic vegetation contained non-detectable levels of Cs-137, off-site locations had levels <0.04 pCi/g, wet weight, and mercury content < 0.06 mg/kg most with levels <MDL
  - Sediments over all values <0.72 pCi/g, dry weight, of Cs-137; consistent with levels in previous years
  - Mercury in sediments generally < 0.19 mg/kg
- **Terrestrial Sampling**
  - Garden Vegetables: no detection of Cs-137
  - Garden Soils at background levels: 0.17 pCi/g, dry weight, of Cs-137
  - 2012 last year for garden vegetable monitoring
  - Grassy Vegetation: no detection to 0.39 pCi/g, wet weight, of Cs-137
  - Associated Soils: Cs-137 0.41 to 43.9 pCi/g, dry weight, most at background; high value located at FHWMF wetland and is below clean-up goals

Chapter 6 – Flora and Fauna Monitoring (continued)

- **Basin Sediments**
  - Detectable levels of Cs-137 at CSF and HT-W basins < 0.17 pCi/g, dry weight
  - Metals in basins were all less than SCDHS action levels or NYSDEC industrial levels; most results within typical background levels
  - SVOCs were mostly less than MDLs with exception of Basin HT-W which had several PAHs with levels greater than SCDHS action levels; additional monitoring has been implemented – source may be natural or from road runnoff.
  - PCBs and pesticides found at low levels consistent with past monitoring
- **Precipitation Monitoring**
  - Quarterly analysis for radiological components indicated normal background
  - Mercury analysis indicated depositional values between 2.92 ng/L to 11.6 ng/L consistent with what has been seen since monitoring began in 2006

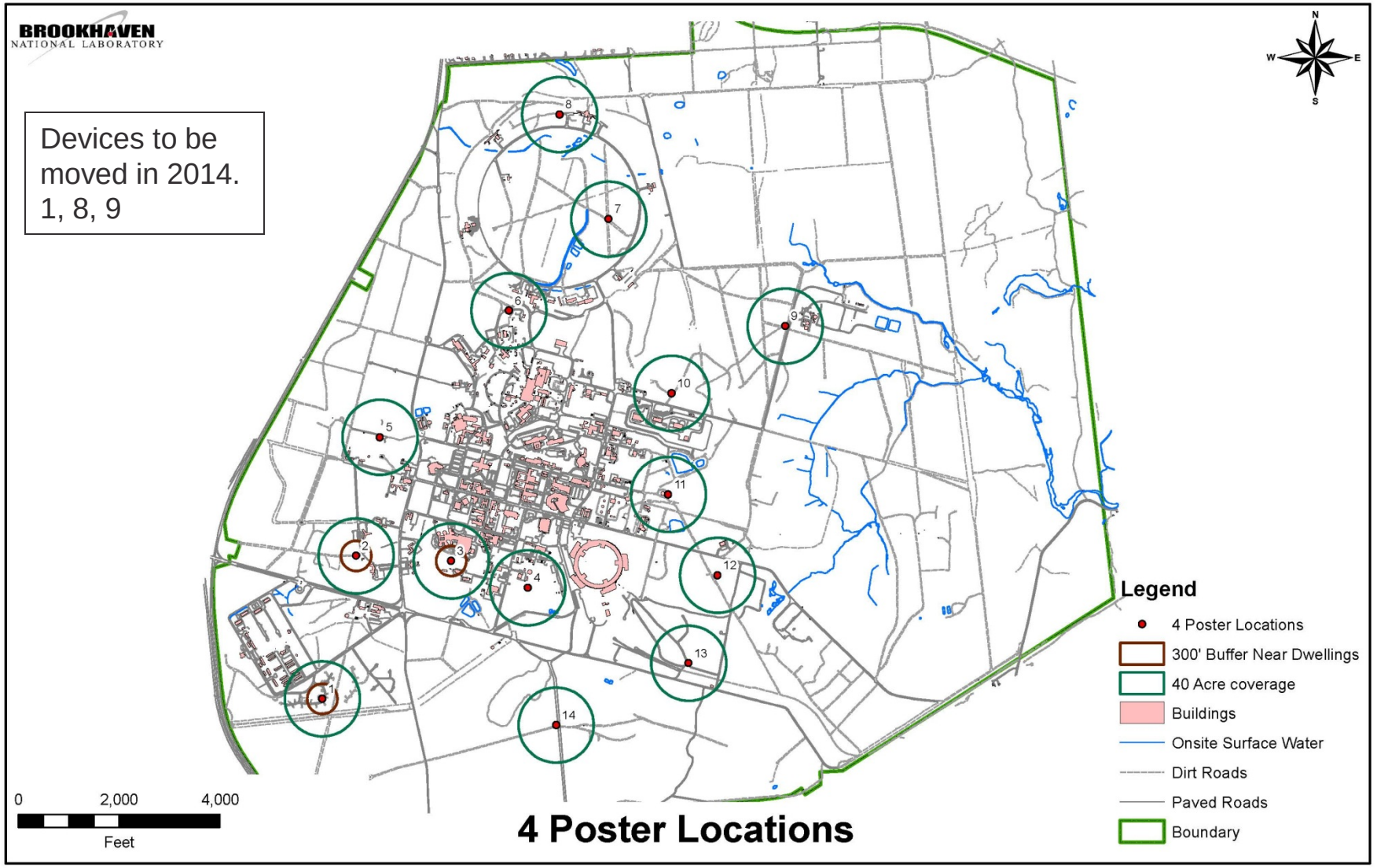
Chapter 6 – Flora and Fauna Monitoring (continued)

- **2012 Peconic River Post Cleanup Monitoring**
  - First year of required reporting in SER
  - No fish monitoring associated with post cleanup
    - alternates with surveillance monitoring. Post cleanup fish monitoring will occur in 2013. (We presented preliminary 2013 data back in September)
  - Mercury sampling of sediment consisted of three samples, two below 2.0 mg/kg, one with 3.6 mg/kg mercury
  - Mercury and methyl mercury sampling in water column;
    - 9 stations in both June and July could not be sampled due to low water levels.
    - Mercury in STP effluents continued to decline with ongoing mercury minimization efforts.
    - concentrations of both generally trended downward the further from the STP outfall.

Natural Resources - Deer

- Deer Management
  - Population estimated at ~ 600 animals currently
- Environmental Assessment
  - Completed in March 2013
  - Preferred Alternative – Integrated Wildlife Damage Management
- Archery Hunt
  - Developed Hunt Plan Committee
  - Developed the Plan
  - Reviewed by Management
  - Will not be implemented at this time
- Culling
  - East end going through planning stages for deer cull
  - Farm Bureau, East end towns, USDA – WS
  - BNL has asked for cost estimate to be included in action
  - Planning to move forward

Tick Management



4 – Poster Deployment

- Devices deployed March – Sept. avoiding hunting season
- Tick monitoring – before, during, after annual deployment – too early to determine effectiveness
- Photo monitoring of each device (game cameras deployed)
  - Thousands of photos taken
  - Photos show deer, raccoon, squirrels, turkey, and a few other animals using the devices.

4 – Poster Deployment

- Other data still being tallied for annual report
  - Amount of corn used
  - Amount of tickicide used
- Operation is definitely labor intensive
  - Devices monitored 2x/week
  - Add corn, add tickicide, change rollers, repair damage
  - Maintain log books
  - Download cameras, sort photos
  - Conduct tick surveys

Tick Management

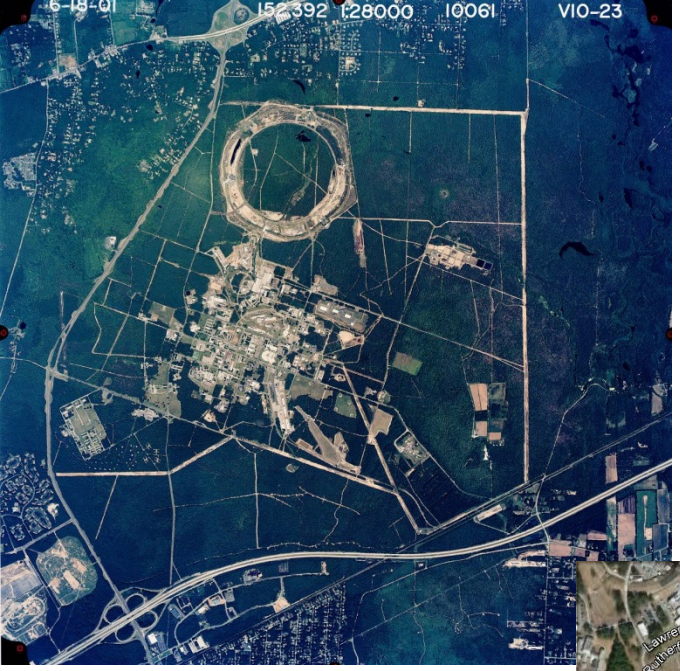
- New tool - *Metarhizium anisopliae* strain F52
  - Fungus than can be applied to forest understory and turf
  - Attacks ticks and kills them from inside out
- Investigating its use in areas where the 4-Poster can't be used

Source: planetearth.nerc.ac.uk

Long Island Solar Farm Studies

Objectives

- Compare small mammal population inside and outside the LISF. Compare vegetation inside and outside the solar facility to determine food sources available for small mammals.
- Assess wildlife use of openings along fence bottoms and natural gaps to document species use and frequency of use by opening type.
- Determine eastern box turtle and other reptile and amphibian use of the solar facility.



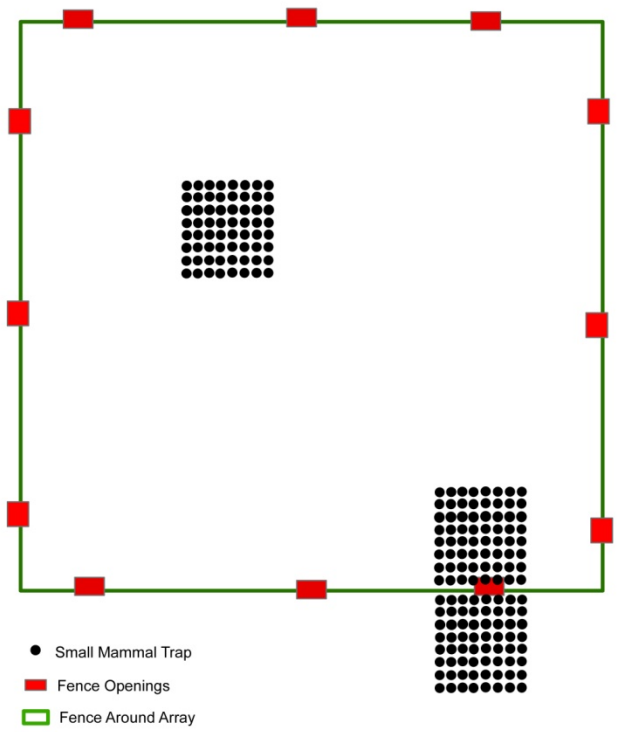
Before

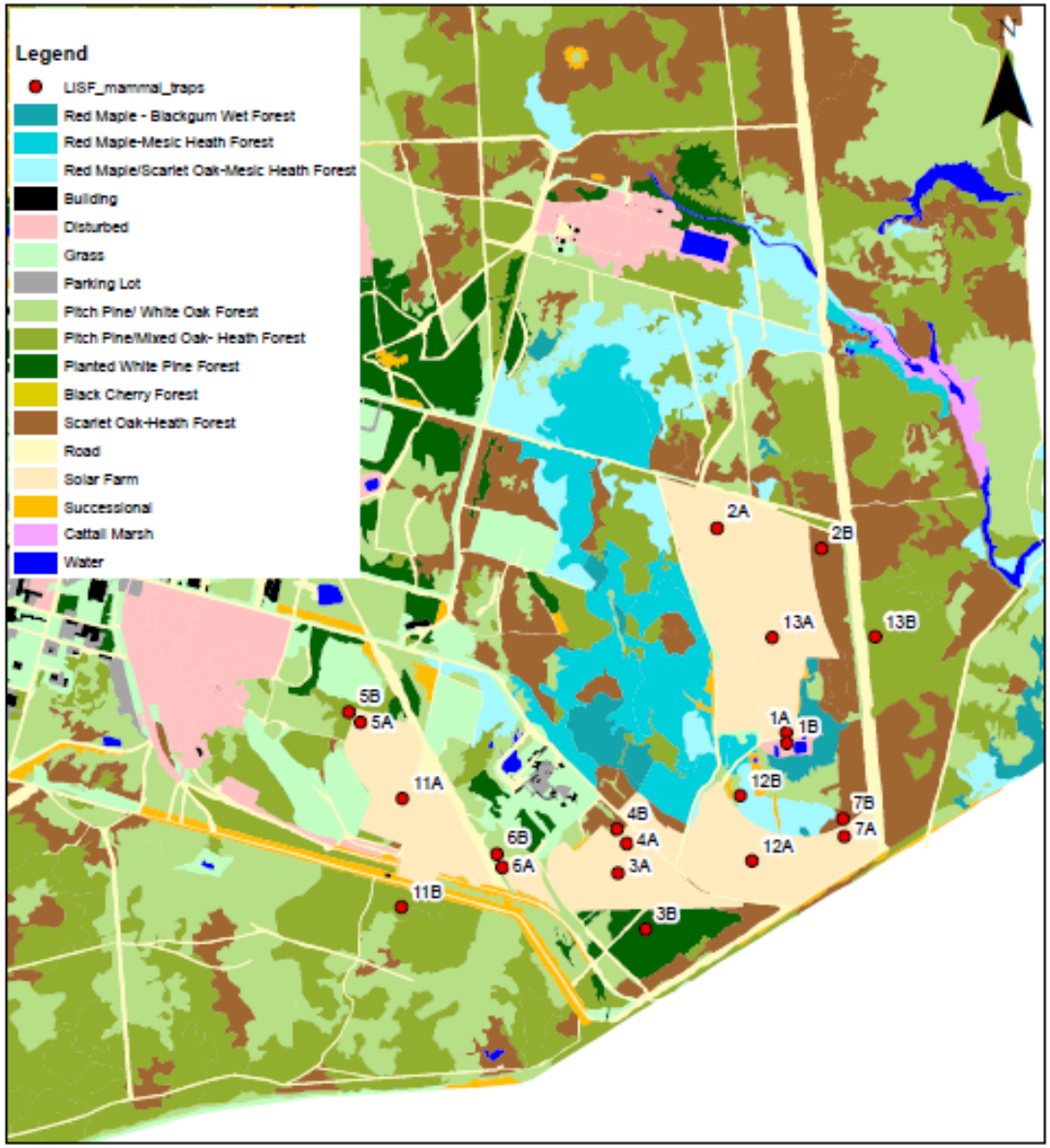
Post Construction

Small Mammals

- 10 Locations
  - 5 along fences
  - 5 interior of solar array or habitat
- 8x8 trap grid – 5m apart
- 3 times per year

Figure 4. Small mammal sampling is conducted with Sherman Box traps at 5 meter intervals. An 8x8 grid is placed in the center the solar array, on the inside of the fence and the outside of the fence. Traps are close to the animals openings in the fence. (Not drawn to scale.)

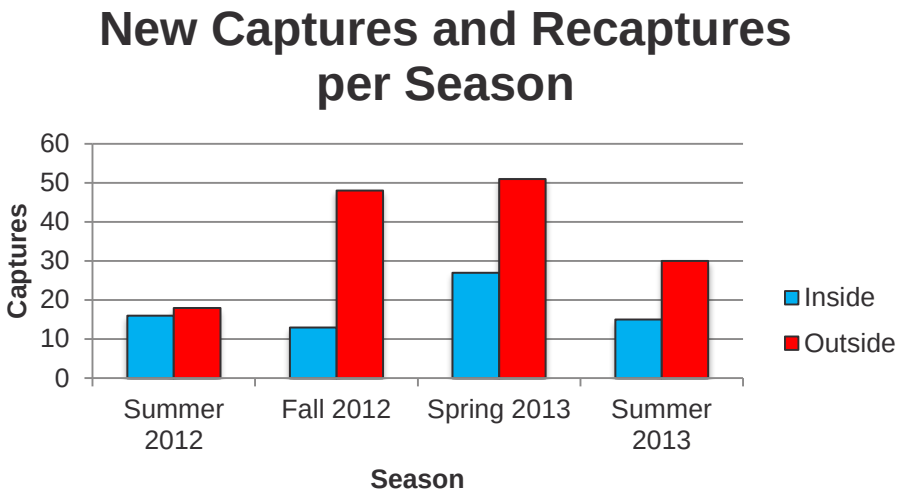


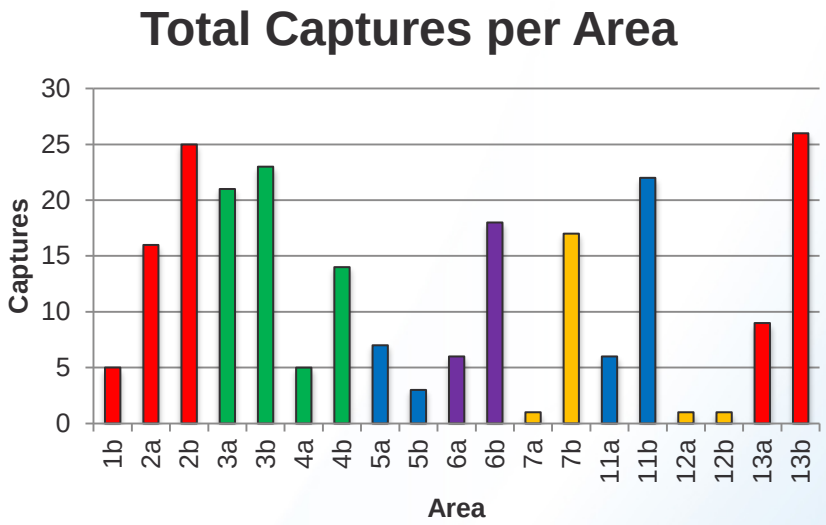


Location of Small Mammal Traps

Small Mammals

Small Mammal Trapping





Array 1 - Red Array 2 - Yellow
Array 4 - Green
Array 5 - Purple Array 6 - Blue

Species	Chipmunk *(T. striatus)*	Eastern Mole *(S. aquaticus)*	Masked Shrew *(S. cinereus)*	Meadow Jumping Mouse *(Z. hudsonius)*	Meadow Vole *(M. Pennsylvanicus)*	Southern Flying Squirrel *(G. volans)*	White Footed Mouse *(P. leucopus)*
Captures	1	2	2	1	1	4	110
Recaptures	0	0	0	0	1	0	107

Fence Openings

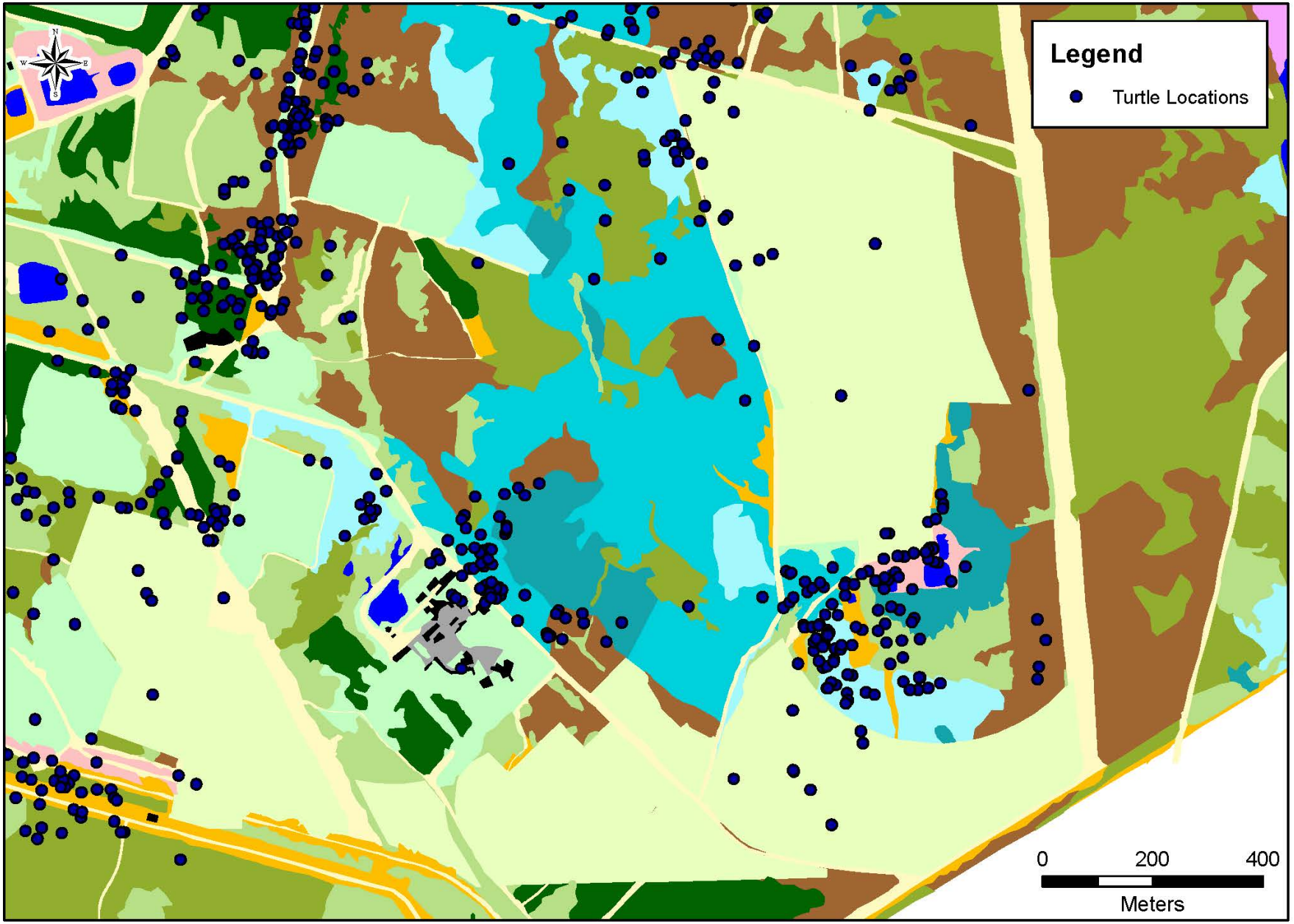
- Fenced
  - 8 ft. tall with 2 ft. tip out
  - Reinforced bar on top and bottom
  - 4 x 12 in. opening every 75 ft.

Methods – Wildlife Use of Fence

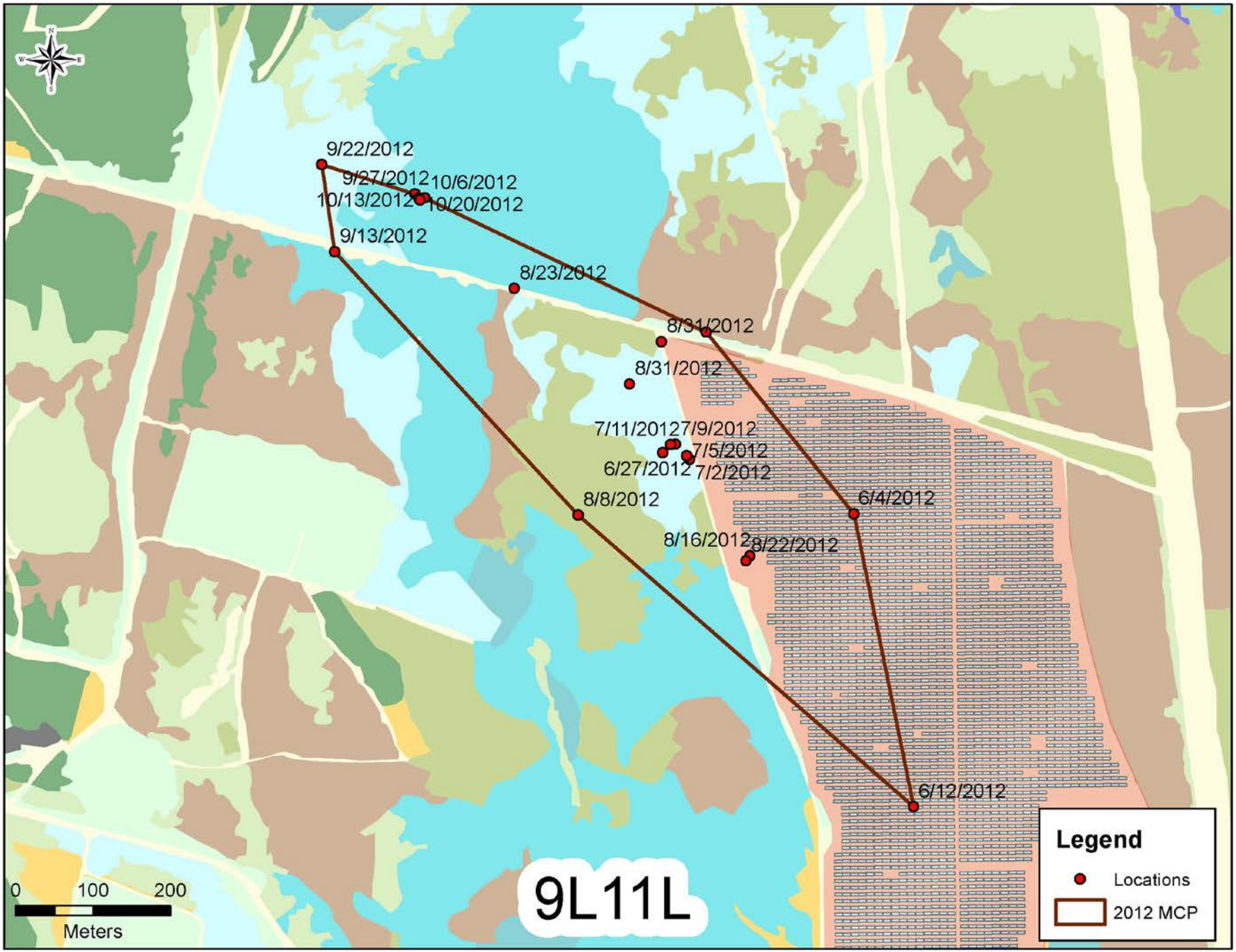
- 11 – 8MP Trail Cameras
- Deployed at fence openings and natural gaps
- Moved every 2 weeks
- Record wildlife use
- Natural Gaps vs. Openings

Reptiles and Amphibians

- Eastern Box Turtle
  - Radio telemetry
  - 26 w/transmitters
- Transect Surveys
  - 30 inside
  - 25 outside



Turtle Telemetry Locations
Long Island Solar Farm


9/22/2012
9/27/2012
10/6/2012
10/13/2012
10/20/2012
9/13/2012
8/23/2012
8/31/2012
8/31/2012
7/11/2012
7/9/2012
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8/8/2012
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9L11L
0
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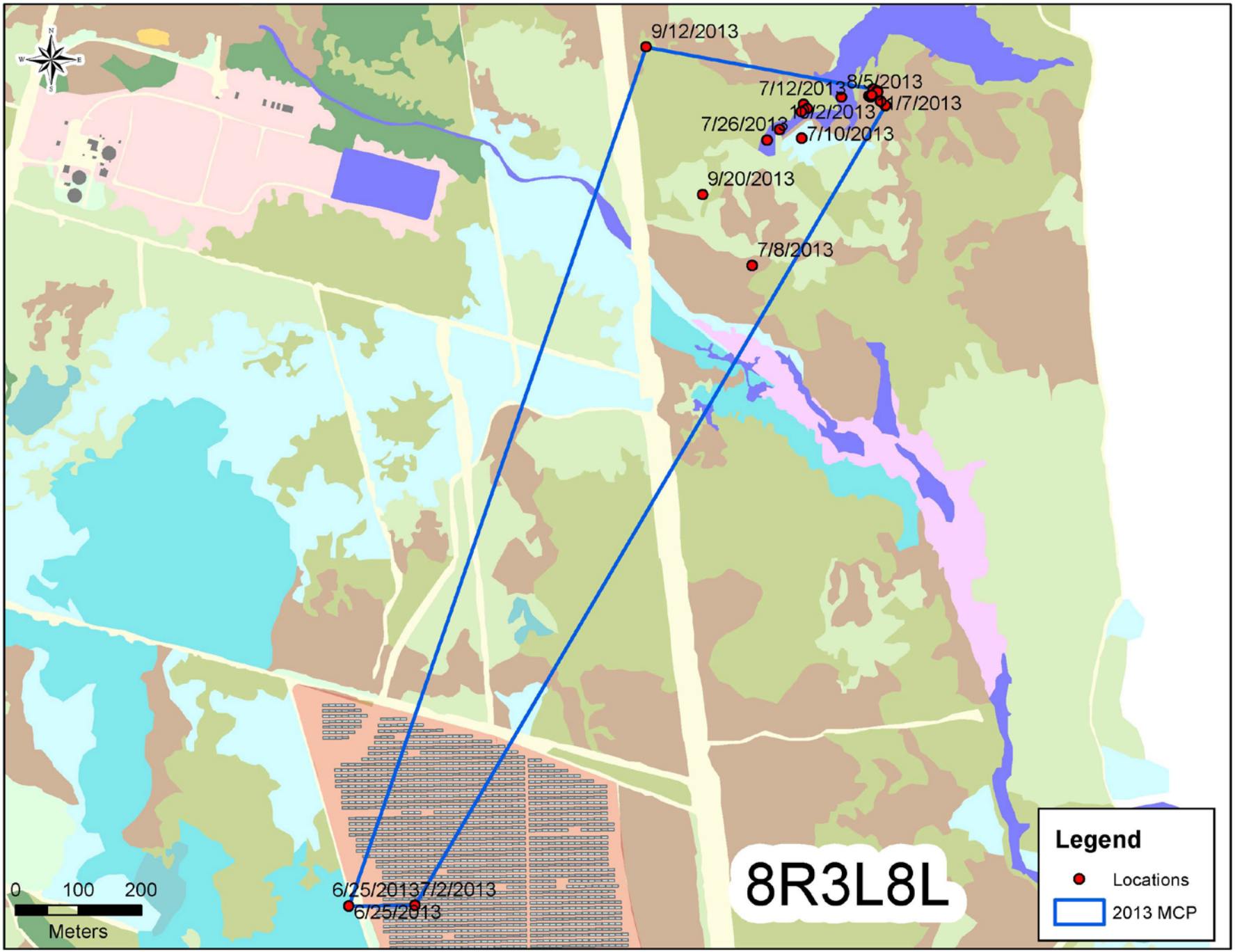
Meters
Legend
Locations
2012 MCP


9/12/2013
7/12/2013
8/5/2013
7/26/2013
7/10/2013
9/20/2013
7/8/2013
6/25/2013
7/2/2013
6/25/2013
8R3L8L
0
100
200
Meters
Legend
Locations
2013 MCP

Amphibians

- Frog Call Surveys
  - FrogWatch USA protocols
- Dip Net / Seine Surveys
- Egg Mass Surveys
  - Salamanders

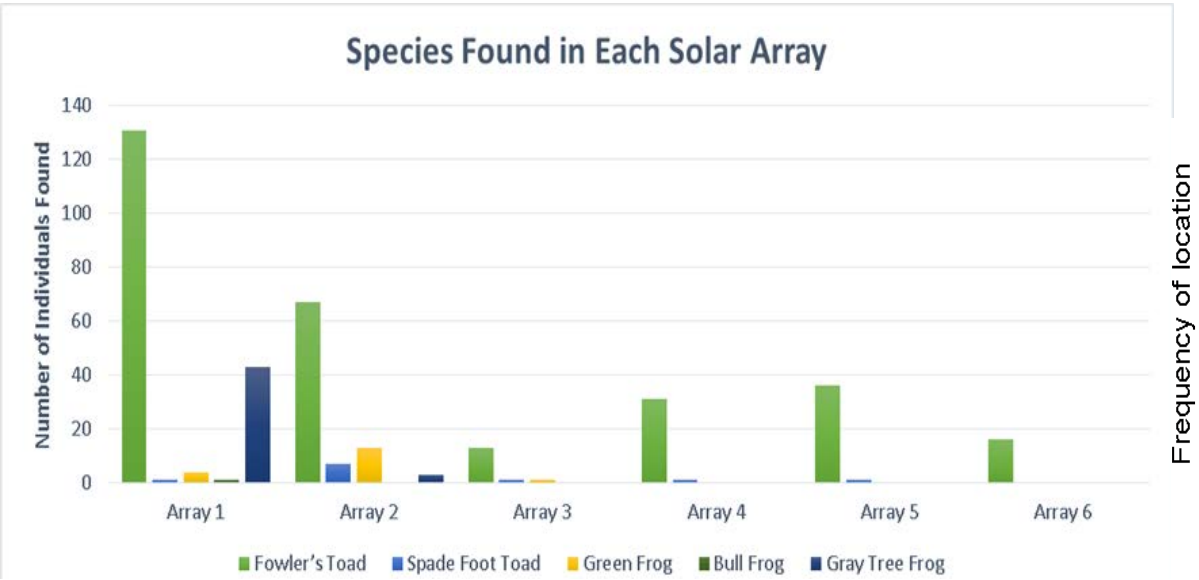
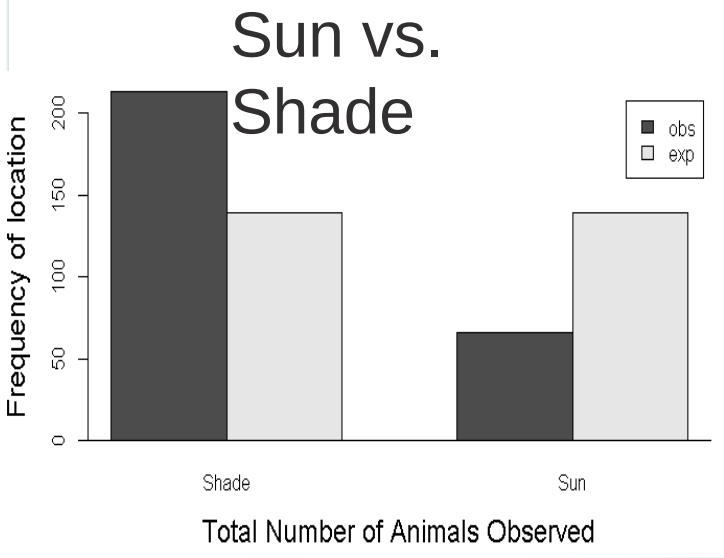
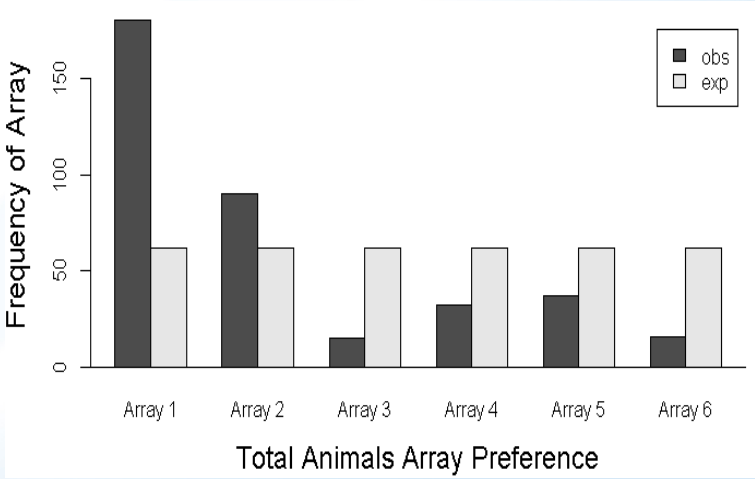


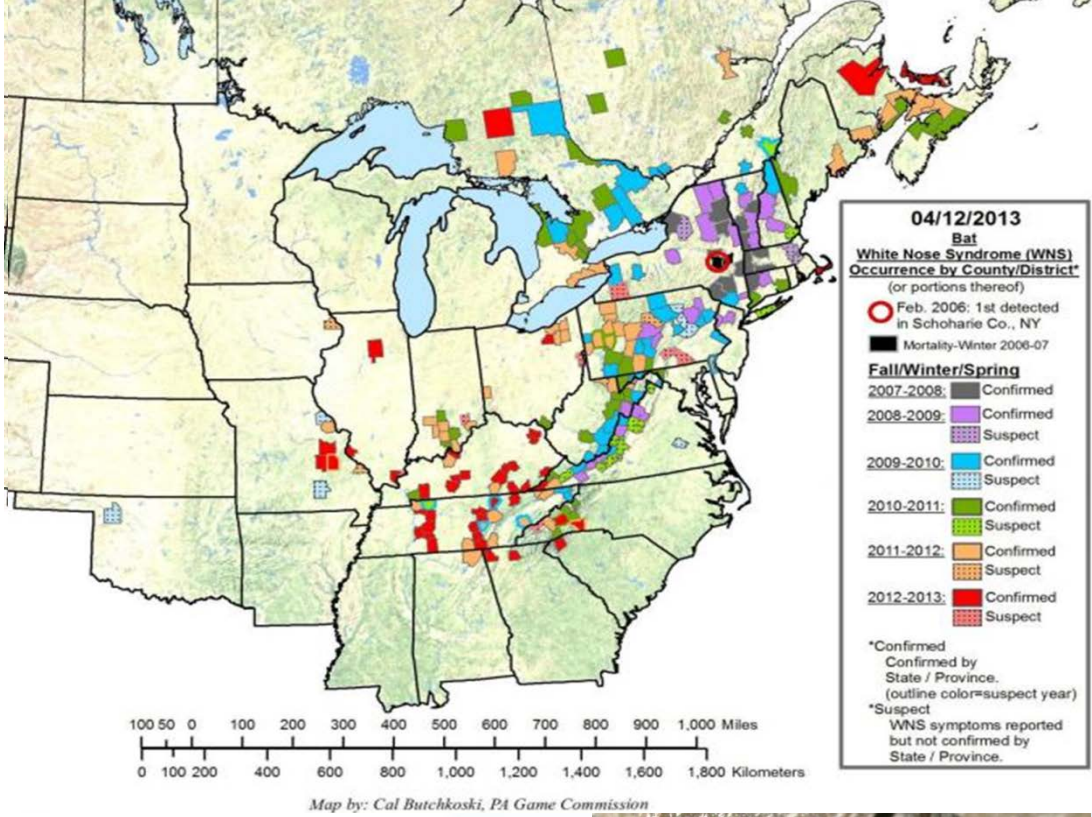
Table 1: Species Observational Presence



Species Found within the solar farm (First-hand account)	Past Sightings within the solar farm (Second hand accounts)
Fowler's Toad	Snapping Turtle (Array 2)
Spade Foot Toad	Eastern Box Turtle (Array 4)
Green Frog	Black Racer Snake (Array 2)
Bull Frog	Hognose Snake
Gray Tree Frog	Garter Snake
Tadpoles (species undetermined)	



Bats - update



- White-nose Syndrome (WNS) identified in 2008 earliest evidence documented its presence in NY in 2006
- Over 6 million bats have died to date
- Once plentiful species may be listed as T&E
  - Northern (Long-eared) bat proposed for listing as Federally Endangered
  - Would be BNL's 1st federally endangered species

BNL and bats

- 2012 surveys had fair abundance of Red, Big Brown, and Northern Bat (15)
- 2013 surveys mostly Red and Big Brown Bats
  - Only one Northern Bat
- Small-footed bats detected acoustically both years
  - Where are they roosting? Are they just passing through?
- Future work to look at potential roosting sites, for Northern Bat and Small-footed bats.
- NYSDEC to do work on LI in 2014.

Questions?

Photo courtesy of Mike Fishman