Sub-objective 1.4 Progress Report

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Stop BMSB.org

1.4 - Identify landscape and temporal risk factors associated with BMSB on crops and in adjacent ecosystems

- Outcomes
  - Determine why and when BMSB leave one host plant for another
  - Determine where BSMB go when they leave
  - Predict BMSB seasonality and risks to other crops
- Methods
  - Monitor movement in and out of fields related to surrounding landscape
  - Monitor movement within fields
  - Techniques – black lights, visual counts, beating, traps, mark-recapture, homeowner reports
  - Map using GIS and geostatistics

The Players

- Rutgers
  - George Hamilton
  - Dean Polk
  - Noel Hahn
- University of Maryland
  - Brian Butler
  - Galen Dively
  - Holly Martinson
  - Michael Raupp
  - Paula Shrewsbury

- Oregon State
  - Peter Shearer
  - Silvia Rondon
  - Vaughn Walton
- Penn State University
  - Shelby Fleischer
  - John Tooker
  - Kevin Rice

Progress To Date

- Results in 2012
  - BMSB presence & distribution in NJ peach orchards affected by surrounding landscape – woods

  - Presence of BMSB in MD nurseries affected by surrounding landscape – soybeans

  - General Public Surveys – NJ, PA and Southern IPM Center

Progress To Date

- Results in 2013
    - NJ spread linked to landscape factors

    - Documented movement between soybeans & wooded areas, significantly more movement from soybeans to woods

    - More BMSB & fruit damage was found in orchard border rows containing a trap, decreased in orchard interior

    - PA & NJ reporting data bases linked to the Early Detection & Distribution Mapping System

Projects in 2014

- The influence of crop management and landscape diversity on damage in tomatoes by BMSB, Kevin Rice - Penn State

- Correlation of NJ blacklight and web report data, Noel Hahn - Rutgers University

Landscape analysis

- Arc GIS
  - NASS USDA
- 200m edge
- Landscape classes
  - Agriculture
  - Forest
  - Orchard
  - Other
- Patch Analysis

Landscape metrics

- Total edge
- Edge density
- Mean patch edge
- Mean perimeter: area
- Mean shape index
- Fractional dimension
- Weighted dimension

- Class area
- Landscape area
- Number of patches
- Mean patch size
- Median patch size
- Patch size std dev
- Patch size coefficient
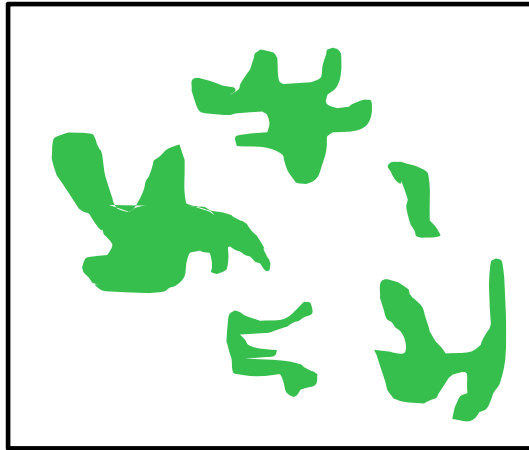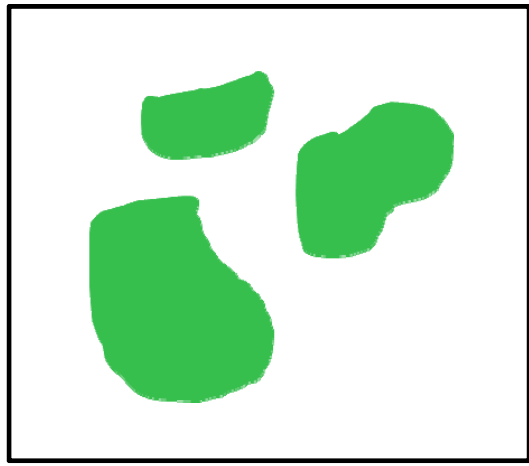
Forests influence damage

Landscape Class	Metric	R-Square	P-Value
Forest	Mean patch edge	0.36	0.0005
Forest	Mean patch size	0.33	0.0009
Forest	Median patch size	0.24	0.006
Forest	Mean shape index	0.18	0.02
Forest	Mean patch fractional dimension	0.17	0.02
Forest	Number of patches	0.14	0.04
Forest	Mean perimeter: area	0.13	0.05
Other	Edge density	0.11	0.04

Two forest metrics influence damage
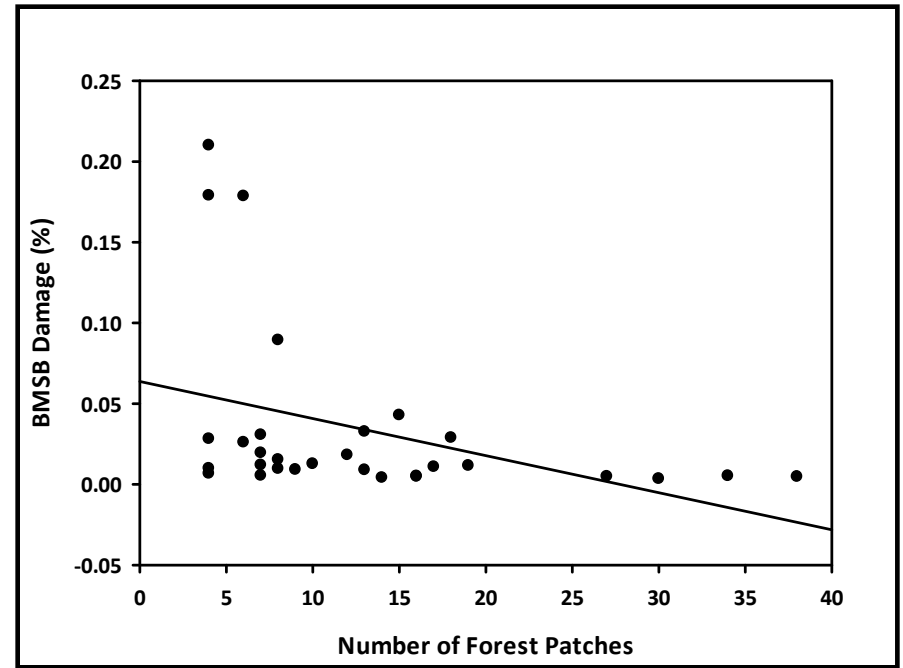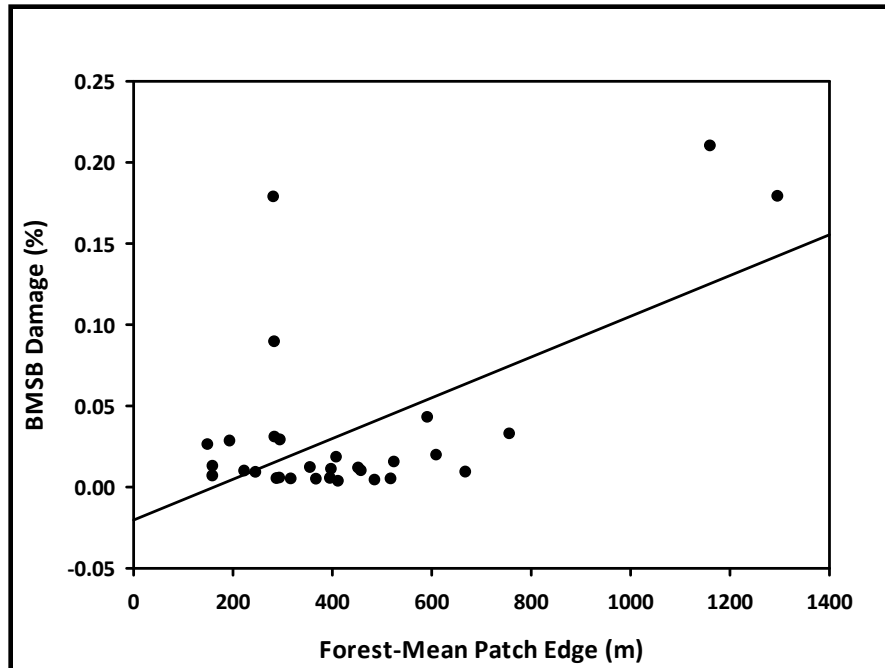
Conclusions

- Damage predictors
  - Forest edge
  - Forest patch number
- Management
  - Edge treatments
  - Trap crops
- Western landscapes?
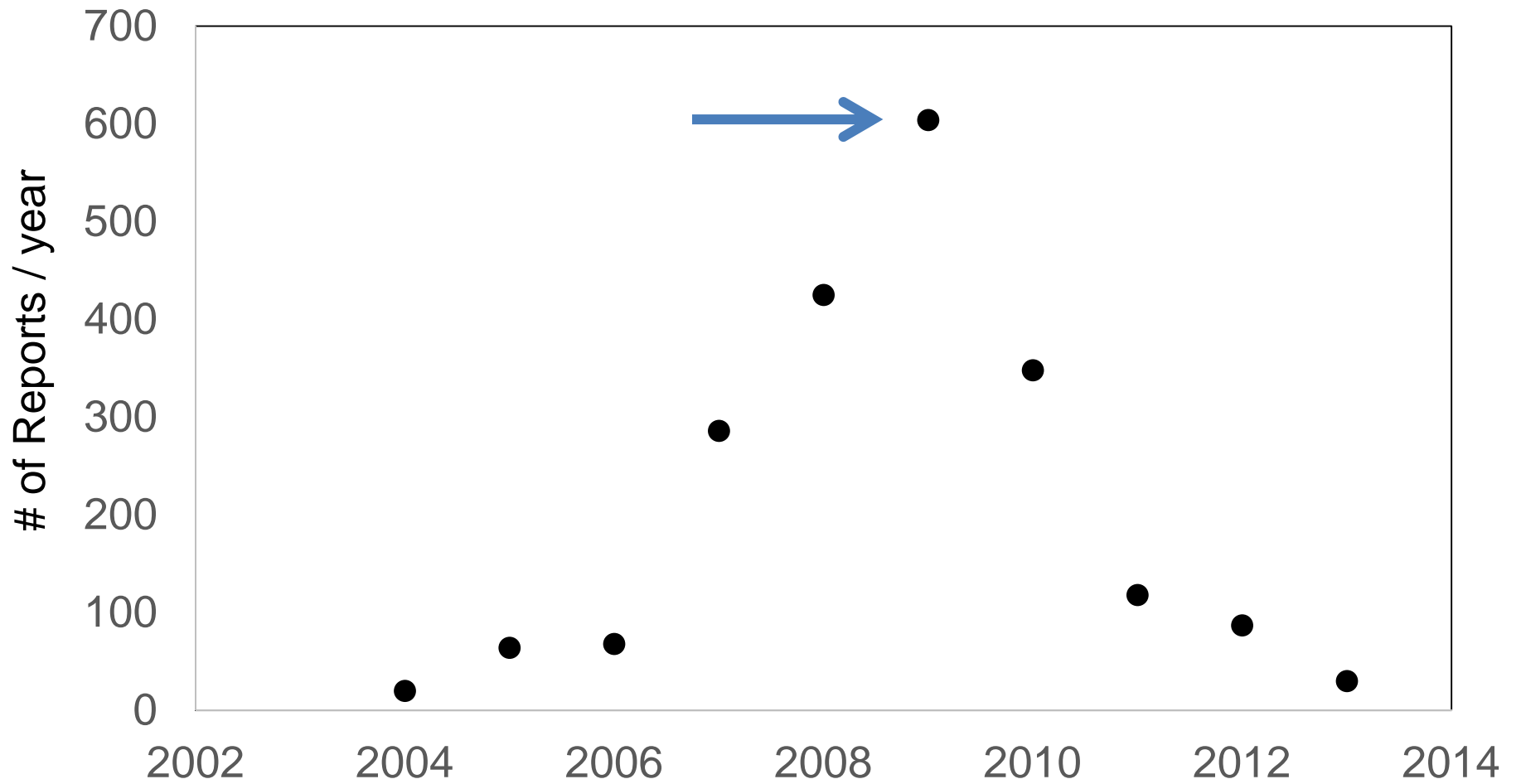- Economic model

Ian Grettenberger, PSU

Correlating blacklights & web reports

- Utilize mapping to visualize web reports of BMSB

- Map trap capture data of BMSB

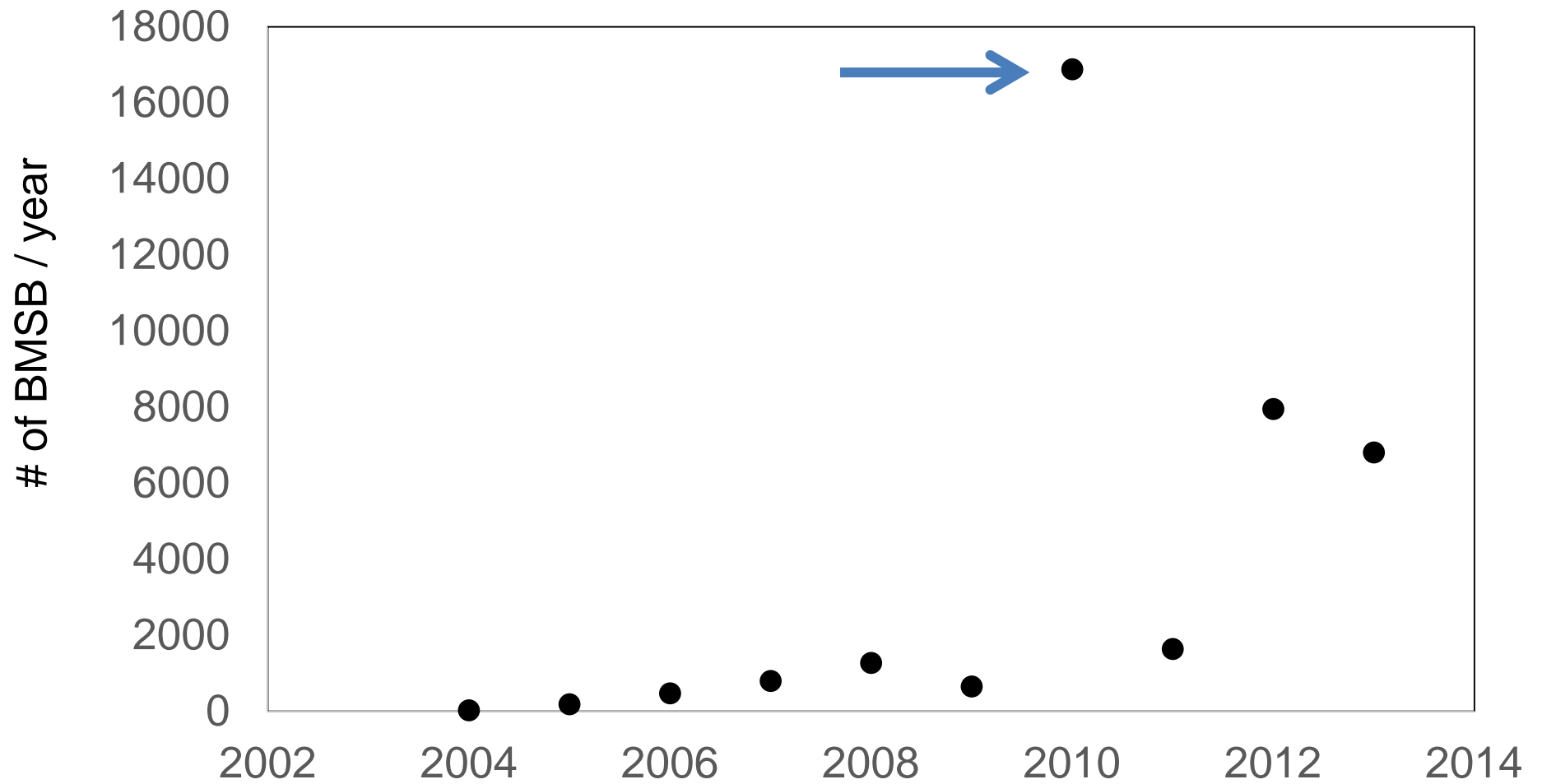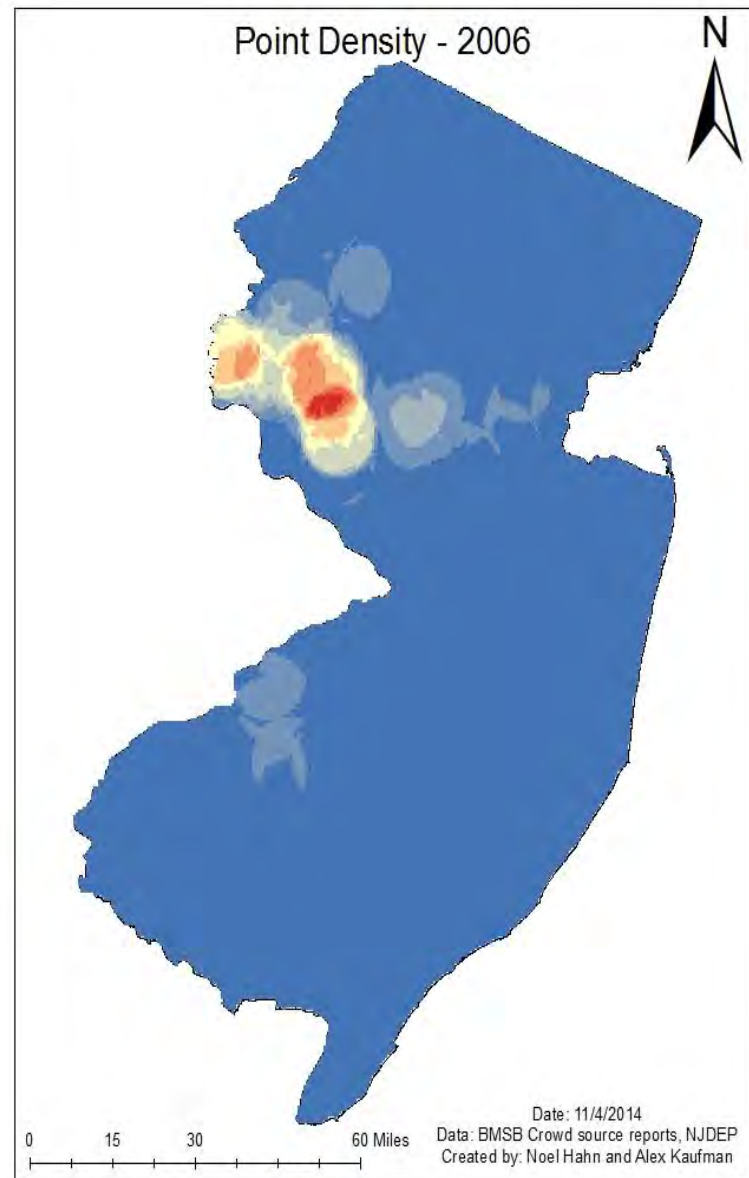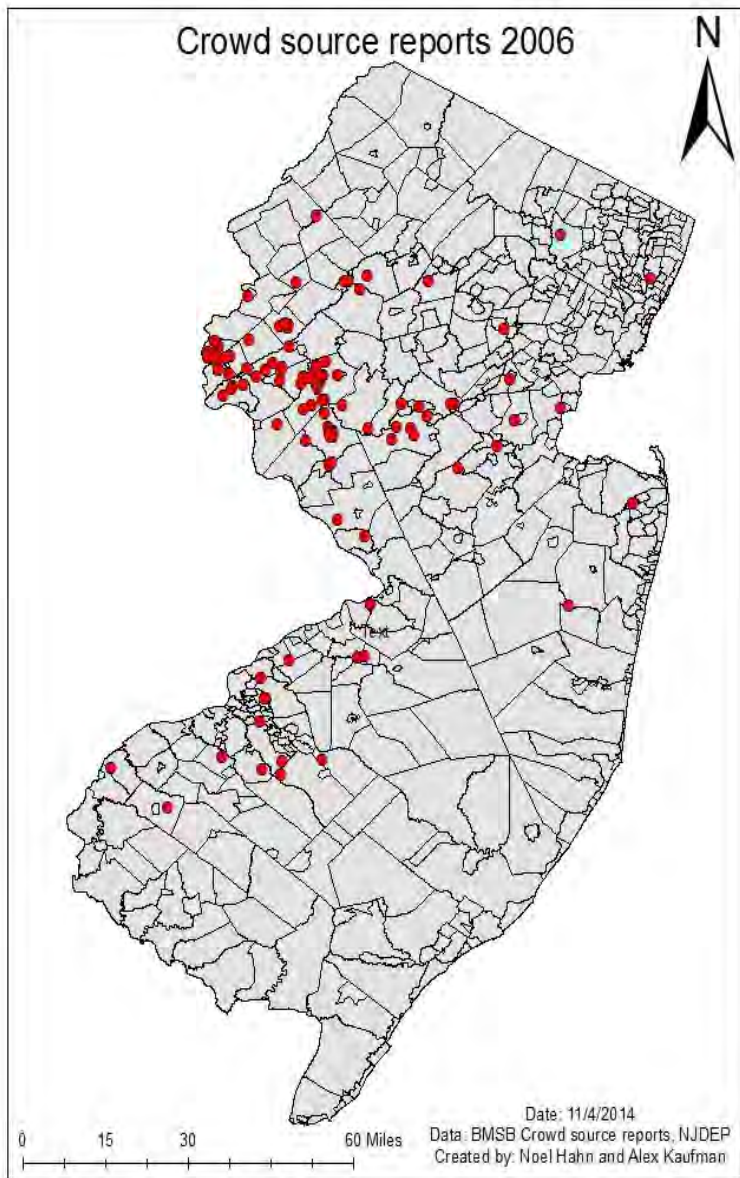- Compare trap capture data to the number of web reports

Hypothesis

- High numbers of reports received from the public regarding BMSB early in a year should correspond to high catches of BMSB in blacklight traps.the same year

- If web reports indicate BMSB leaving and entering overwintering sites in specific regions/areas, the data can be used for broader applications to predict when populations will appear throughout New Jersey in field/farm settings.

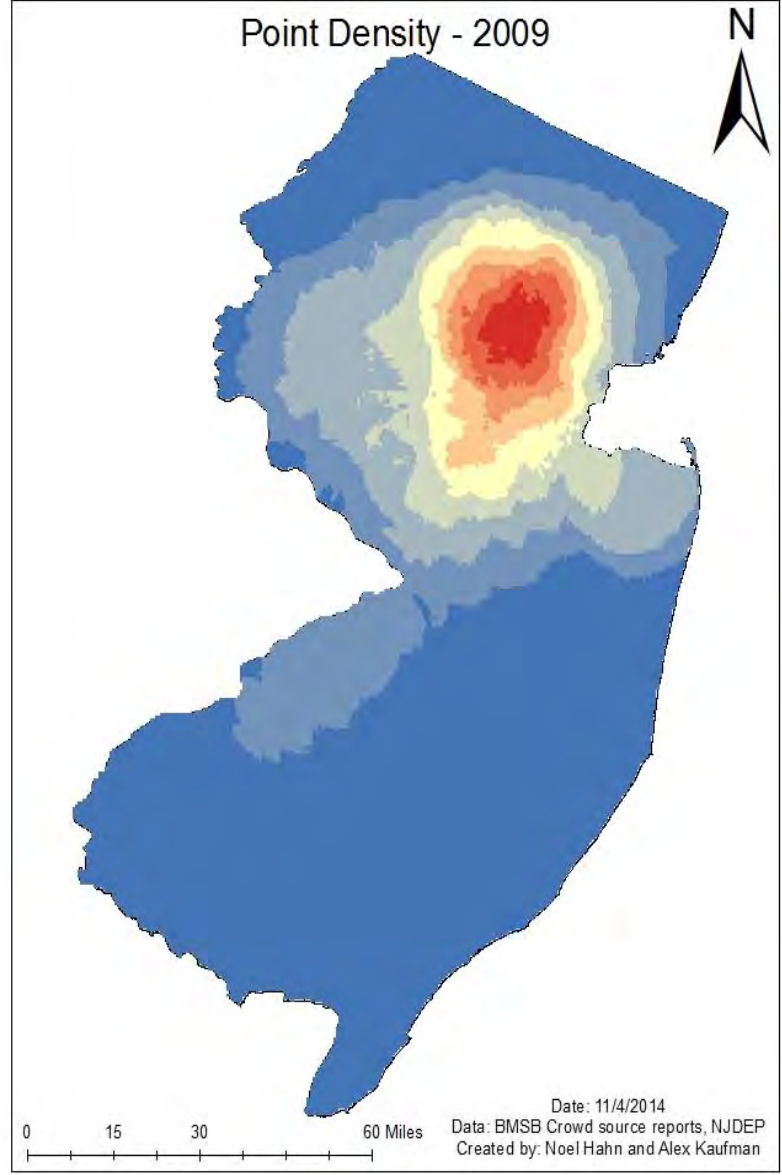NJ BMSB Reports

NJ Blacklight Trap Captures - BMSB

Crowd source reports 2006

N

Date: 11/4/2014
Data: BMSB Crowd source reports, NJDEP
Created by: Noel Hahn and Alex Kaufman

0   15   30   60 Miles

Point Density - 2006

N

Date: 11/4/2014
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0   15   30   60 Miles

Crowd source reports 2009

N

0   15   30   60 Miles

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Point Density - 2009

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0   15   30   60 Miles

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Data: BMSB Crowd source reports, NJDEP
Created by: Noel Hahn and Alex Kaufman

Point Density - 2012

N

0   15   30   60 Miles

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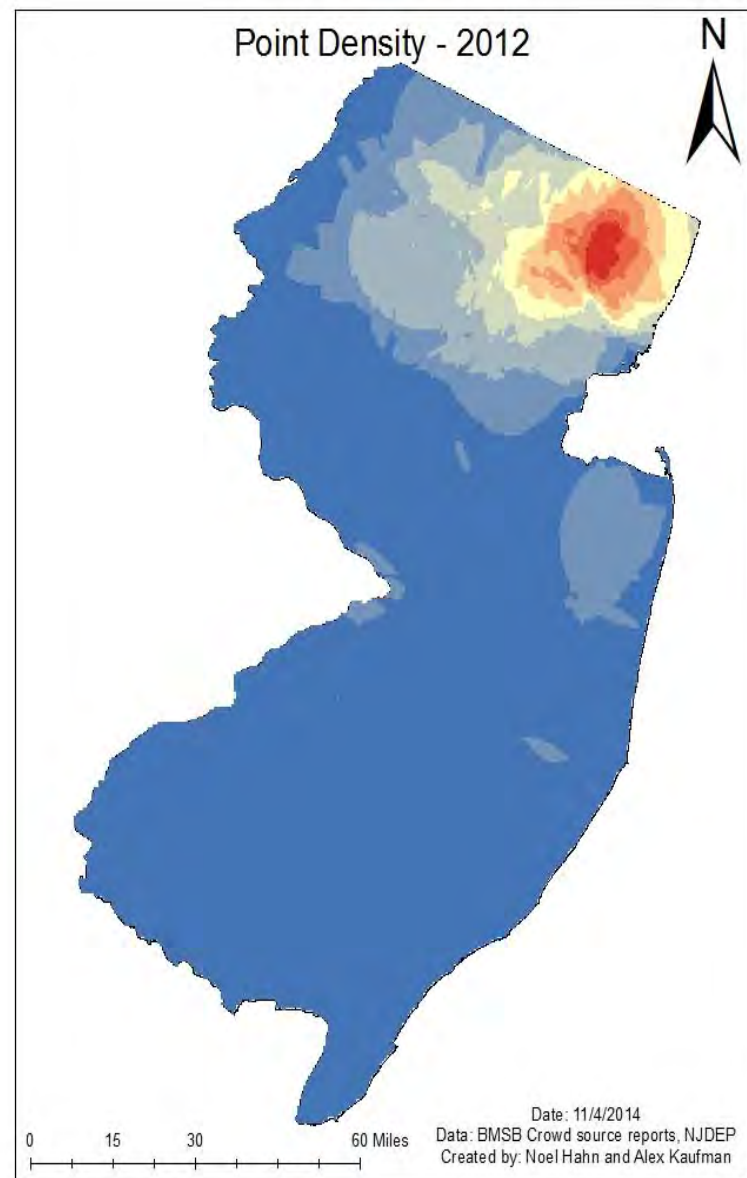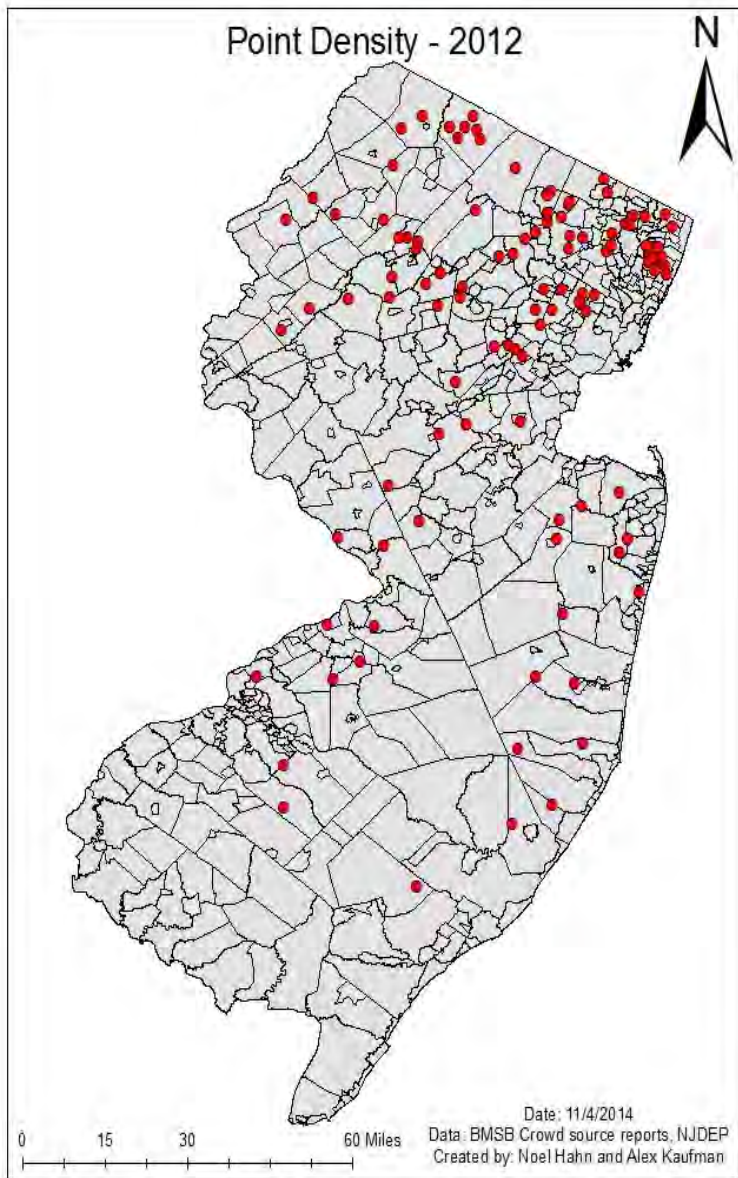
Where We Go Next

- ## Current grant
  - Overlay blacklight and web reports

- ## Renewal
  - Examine BMSB spread over a larger geographical area
  - Link spread to landscape factors such as topography, closeness to agricultural areas, roads, etc.