Doing More with Less: Mosquito Surveillance and Response Planning in a Resource-Scarce State

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WELCOME TO MAINE

Memories to last a lifetime

Maine Arbovirus Timeline

1999

WNV in NY

2001

1st EEE and WNV finds (birds)

2002

Mosquito trapping in proximity to EEE or WNV-infected birds

2005

EEE found in 2 horses, 12 birds from S. ME

2009

cervid serosurvey initiated

2009

EEE found in 15 horses, 1 llama in Central ME. 3 pheasant flocks, 1 mosquito pool EEE in S. ME

2010
Weekly mosquito trapping shifted to EEE, 22 sites

2012
1st human WNV in ME.
VT: 2 human **EEE** deaths. VT conducts aerial application.

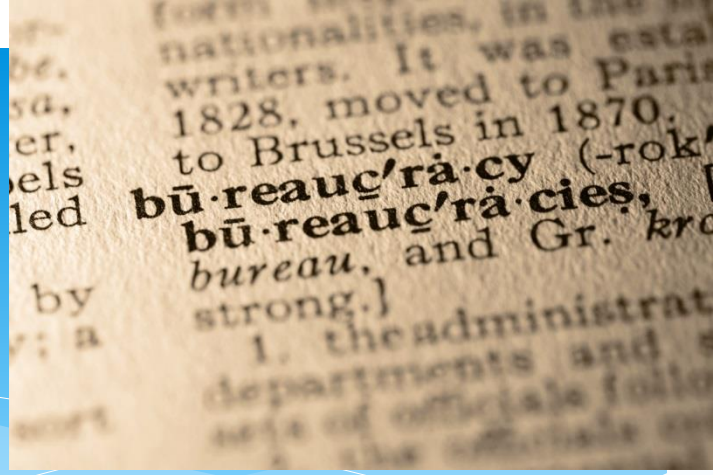
2013
EEE in 2 horses, 12 birds from S. ME

2014
1st human **EEE** case

LD 1808 authorizes govt entities to control mosquitoes if public health threatened

2015
2nd Human WNV case.
1st human **EEE** death.

Plan and MOU Formalizes Cooperation between State Health and Agriculture Departments



State of Maine Department of Agriculture, Conservation and Forestry

Plan to Protect the Public Health from Mosquito-Borne Diseases

Pursuant to Resolve 2013, Chapter 13

Presented by the Maine Department of Agriculture, Conservation and Forestry in Cooperation with the Maine Department of Health and Human Services

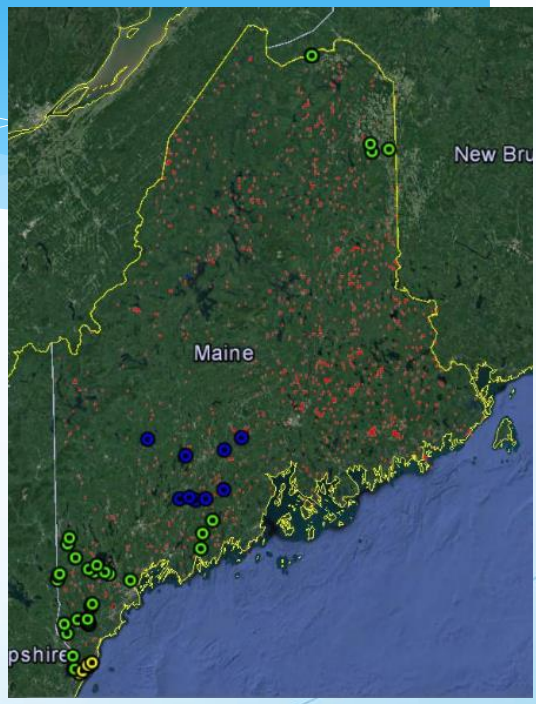
2014. Amended 2015.

Memorandum of Understanding
Between
Maine Center for Disease Control and Prevention (Maine CDC),
Department of Health and Human Services,
And
Board of Pesticides Control,
Department of Agriculture, Conservation and Forestry

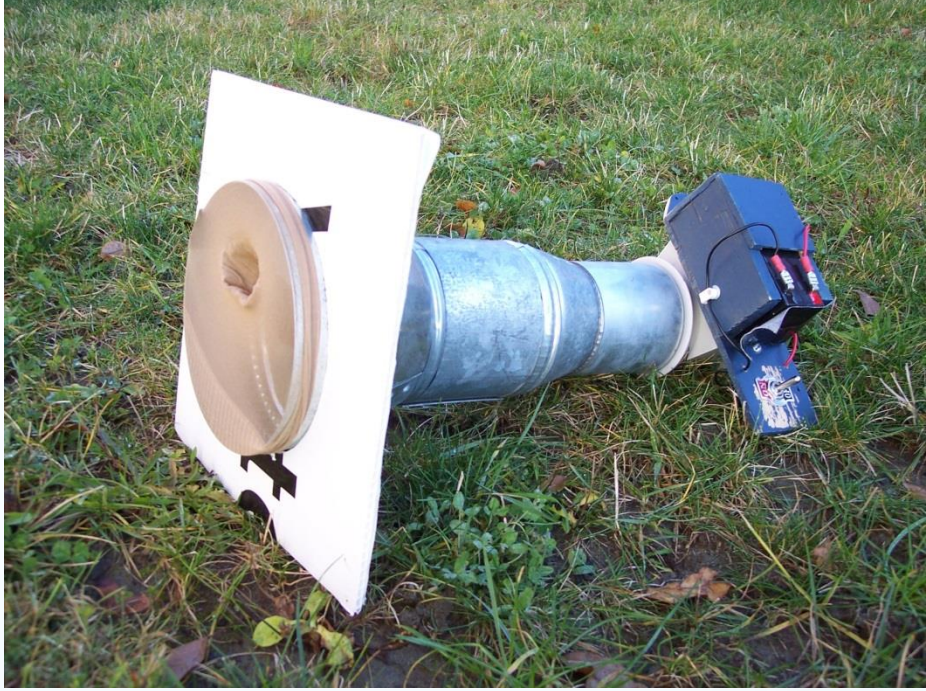
Thinkfirstspraylast.org (search for 'mosquito plan'

Support Mosquito Surveillance and Management within Existing Resources

* Build State-agency capacity for surveillance
* Develop GIS system to identify optimal mosquito surveillance sites
  * Evaluate current ‘long-term’ sites
  * Identify new sites for rapid response and expanded surveillance
* Plan Mosquito Management Action
  * Identify potential treatment areas
  * Identify exclusion zones (eg organic farms)



BPC 3000 Skeeter Vac

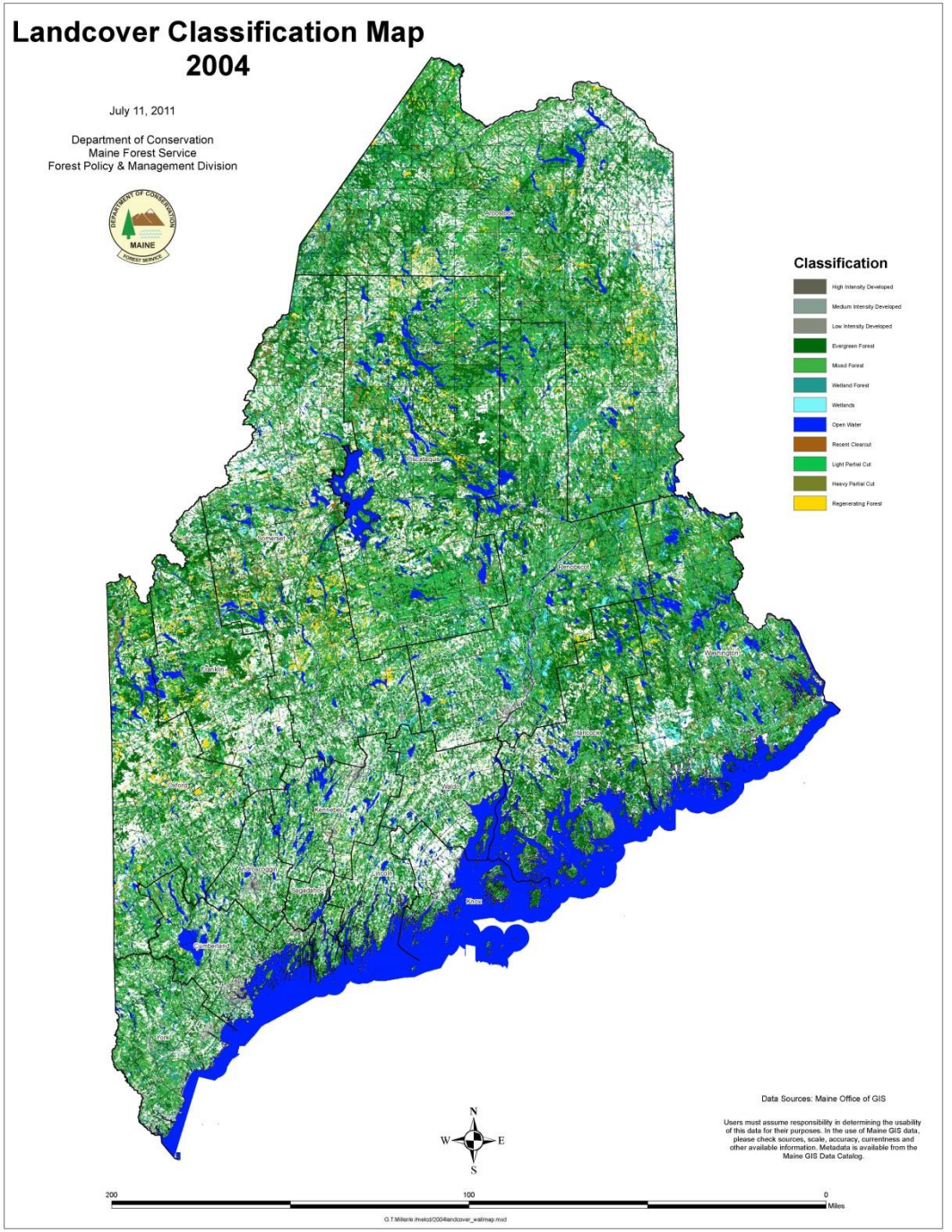


2016
Weekly monitoring at 8 resting box sites.
Light traps at 2 sites

Mosquitoes identified.
Target species transported to Health Lab for testing.

Mosquito Habitat Mapping Project

Megan Patterson, ME Board of Pesticides Control, Dept of Agriculture, Conservation, Forestry

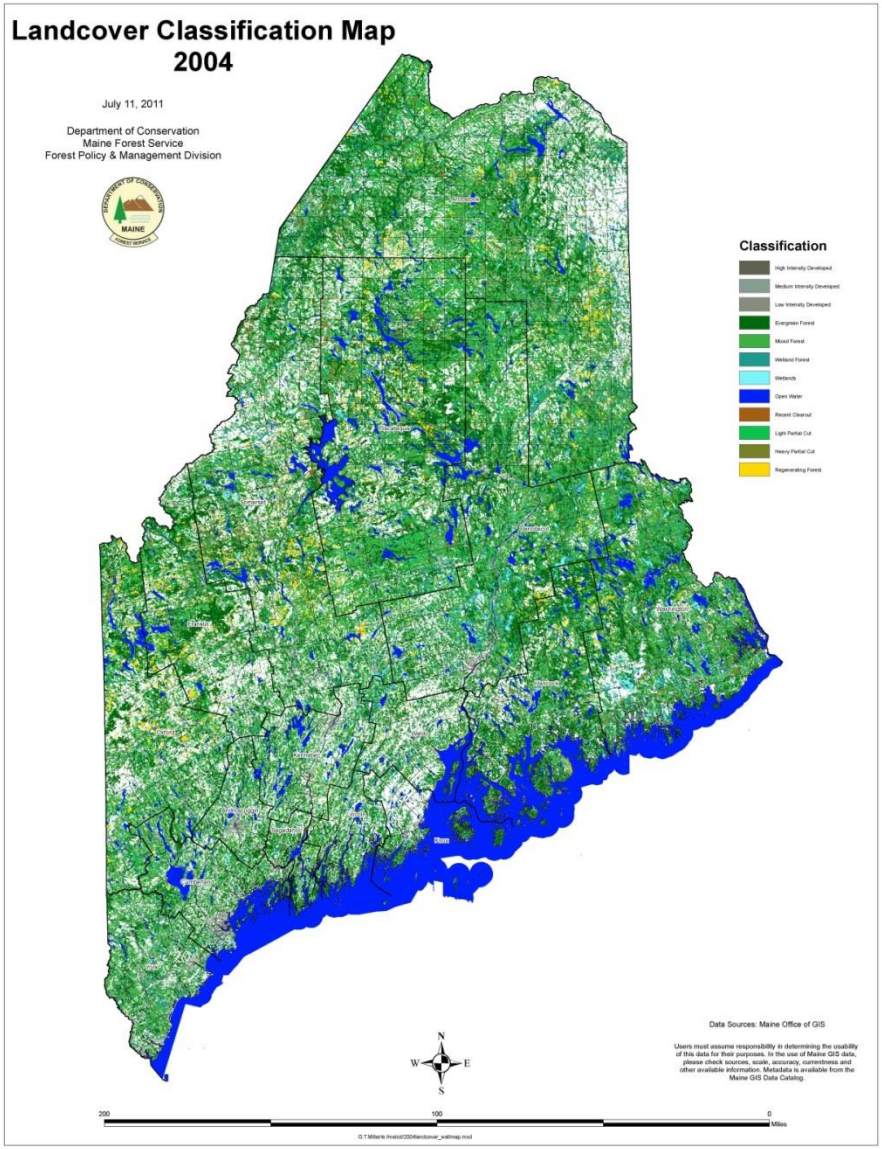


Maine Landcover Dataset (2004)

- Wetland Forest
- Mixed Forest
- Evergreen Forest
- Wetlands

National Wetland Inventory (2013)

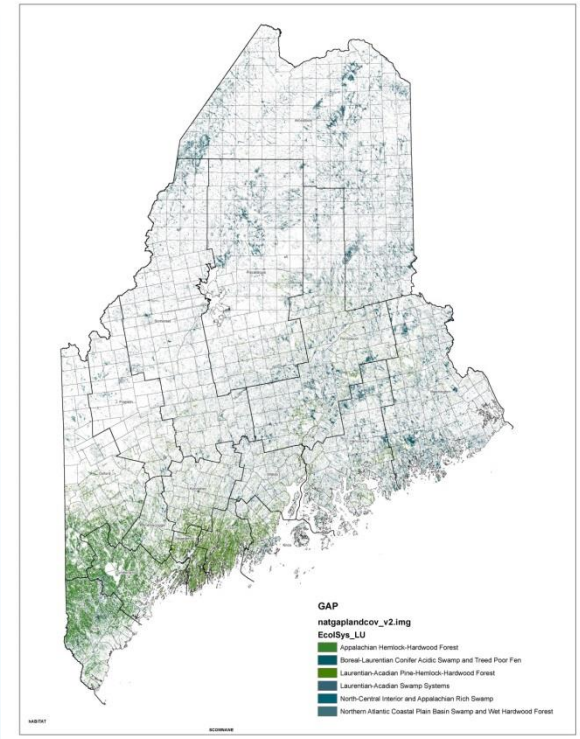
- Palustrine habitat (Scrub-shrub wetland—broadleaved deciduous
- Forested wetland—needle-leaved evergreen
- Forested wetland—broad-leaved deciduous
- And more



USGS Gap Analysis Land Cover Data

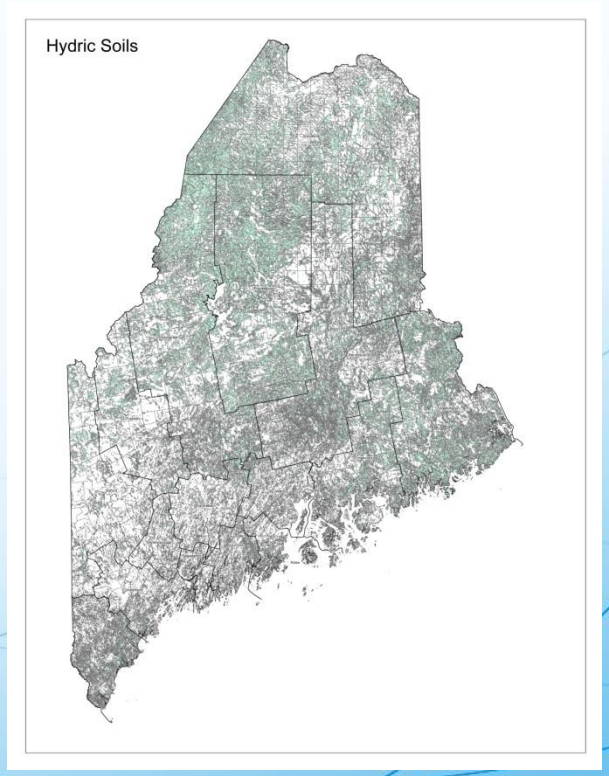
Forested wetland and upland habitat adjacent to a wetland.

- Boreal-Laurentian Conifer Acidic Swamp
- Laurentian-Acadian Pine-Hemlock Hardwood
- And more



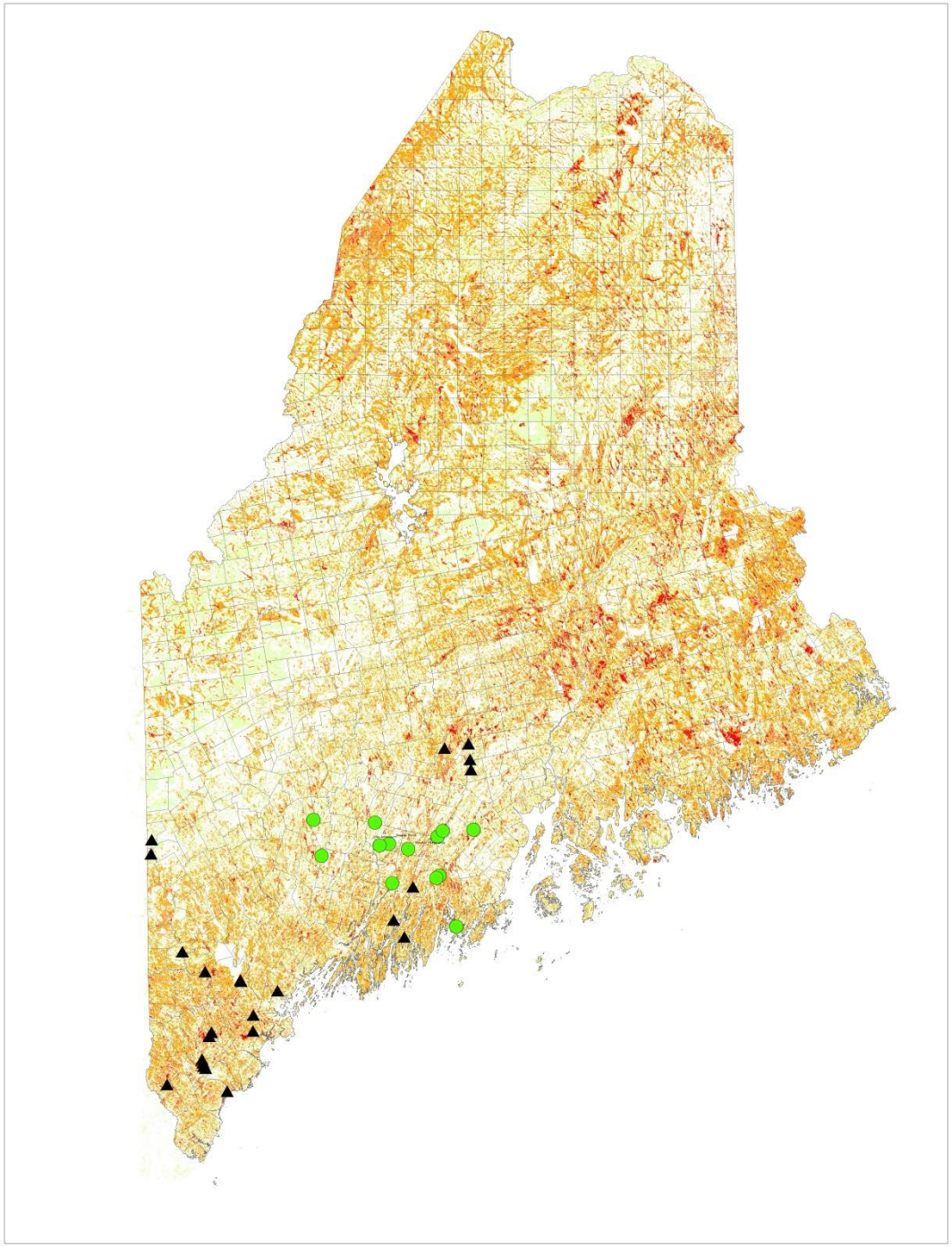
USDA NRCS Soils Data

- Hydric Soils

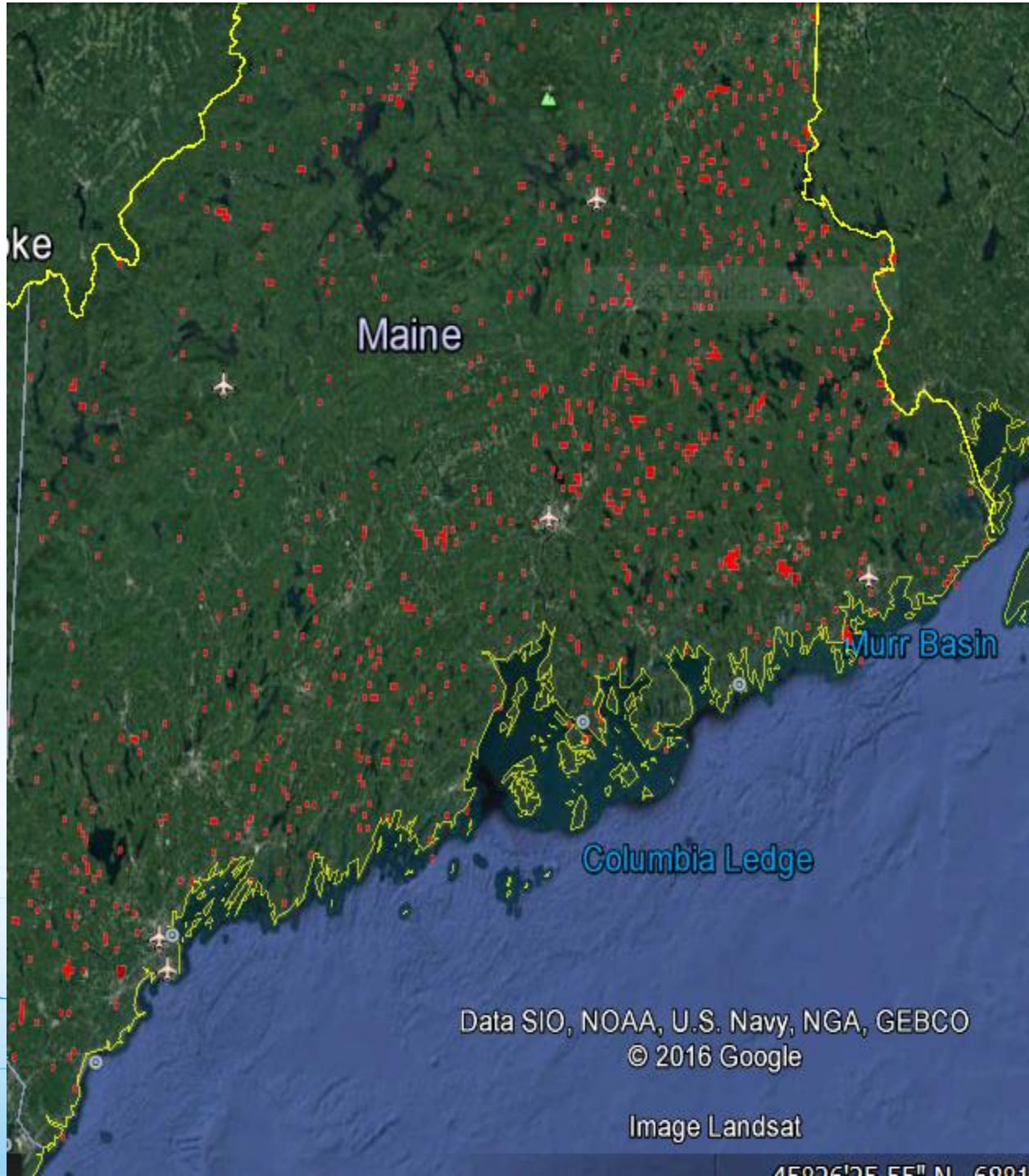


Simple Addition

- Converted polygon (vector data) to raster
- Raster layers reclassified
  - 1=data present
  - 0=not present
- Overlaps were additive



Classified all areas for potential Culiseta breeding habitat. Highest 'risk' areas are where 4 or 5 features overlap.



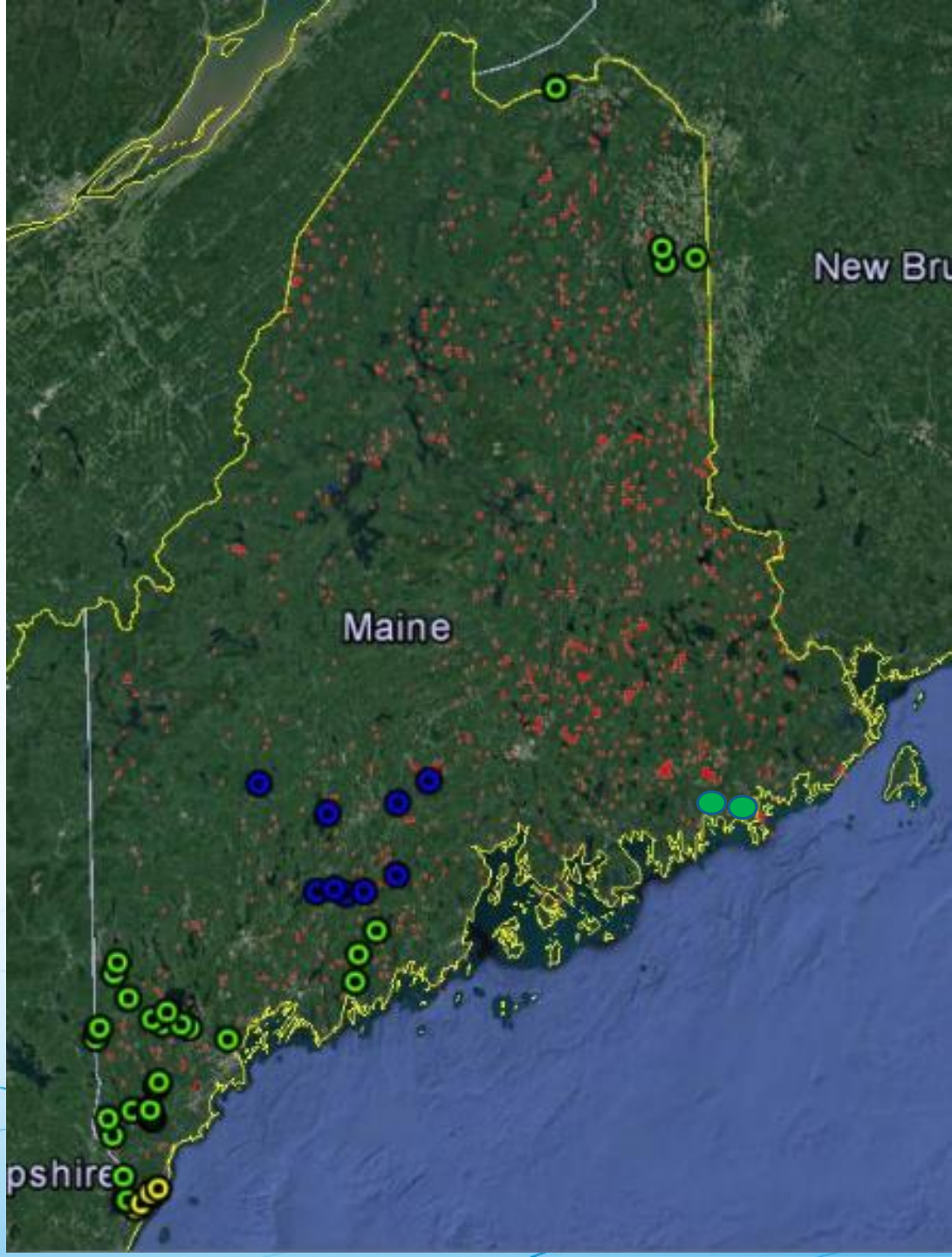
 # Overlapping Features

4

5

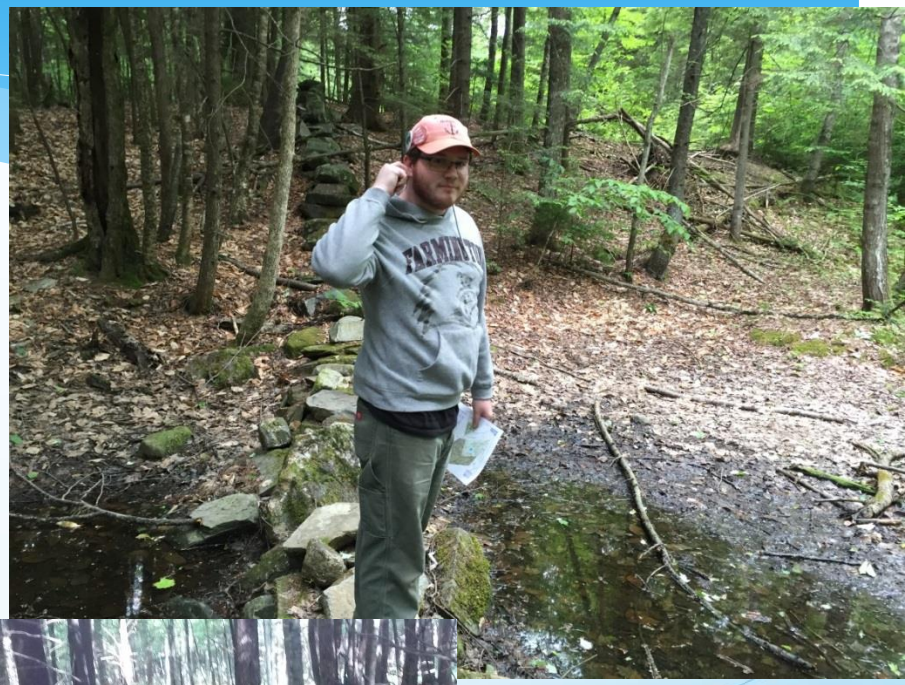
2016 Monitoring Sites

- MMCRI
- DACF
- MPM

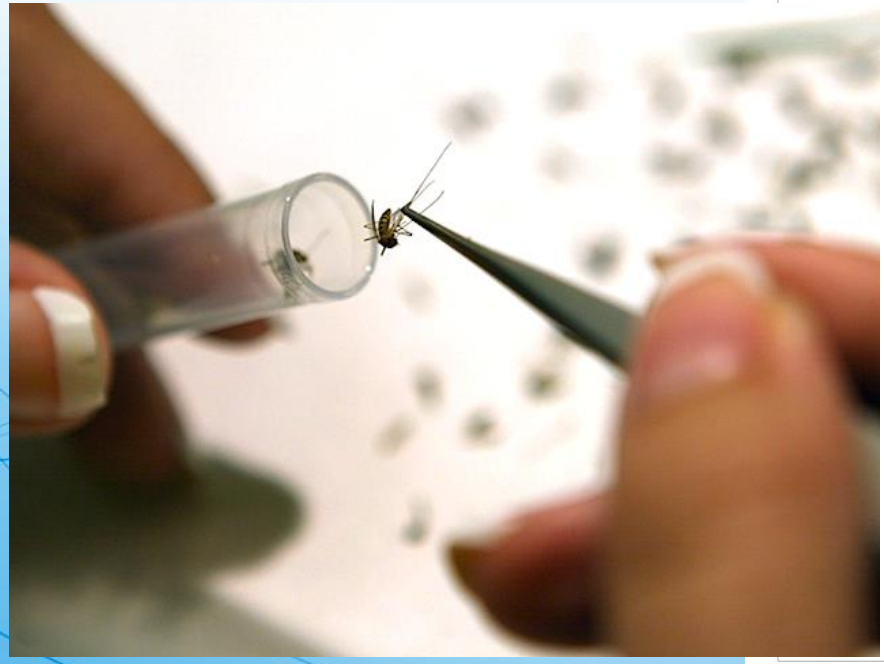


Ground Truthing

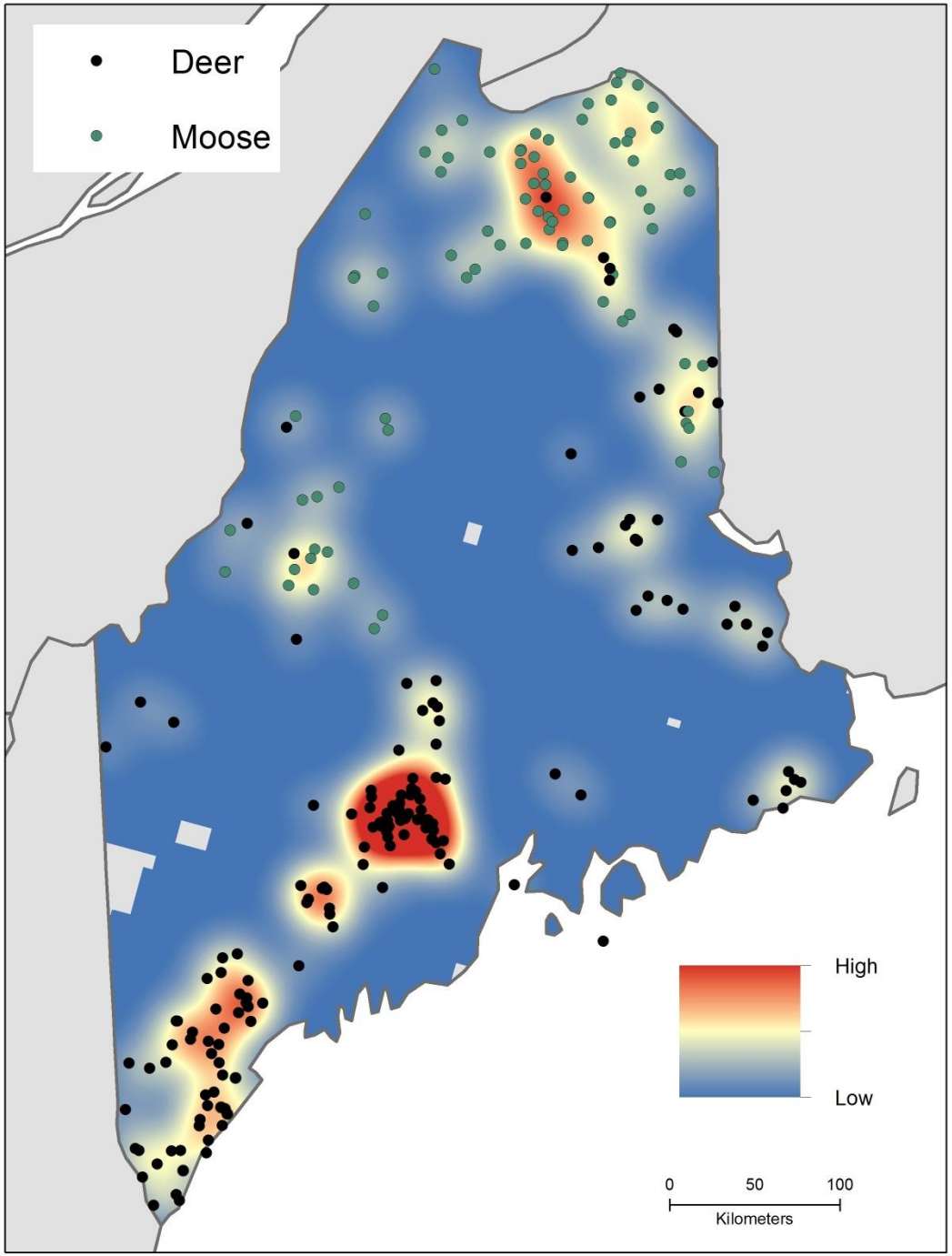
* Visual Assessment
* Criteria:
  * Forested wetland
  * Hardwood swamp
  * Open understory



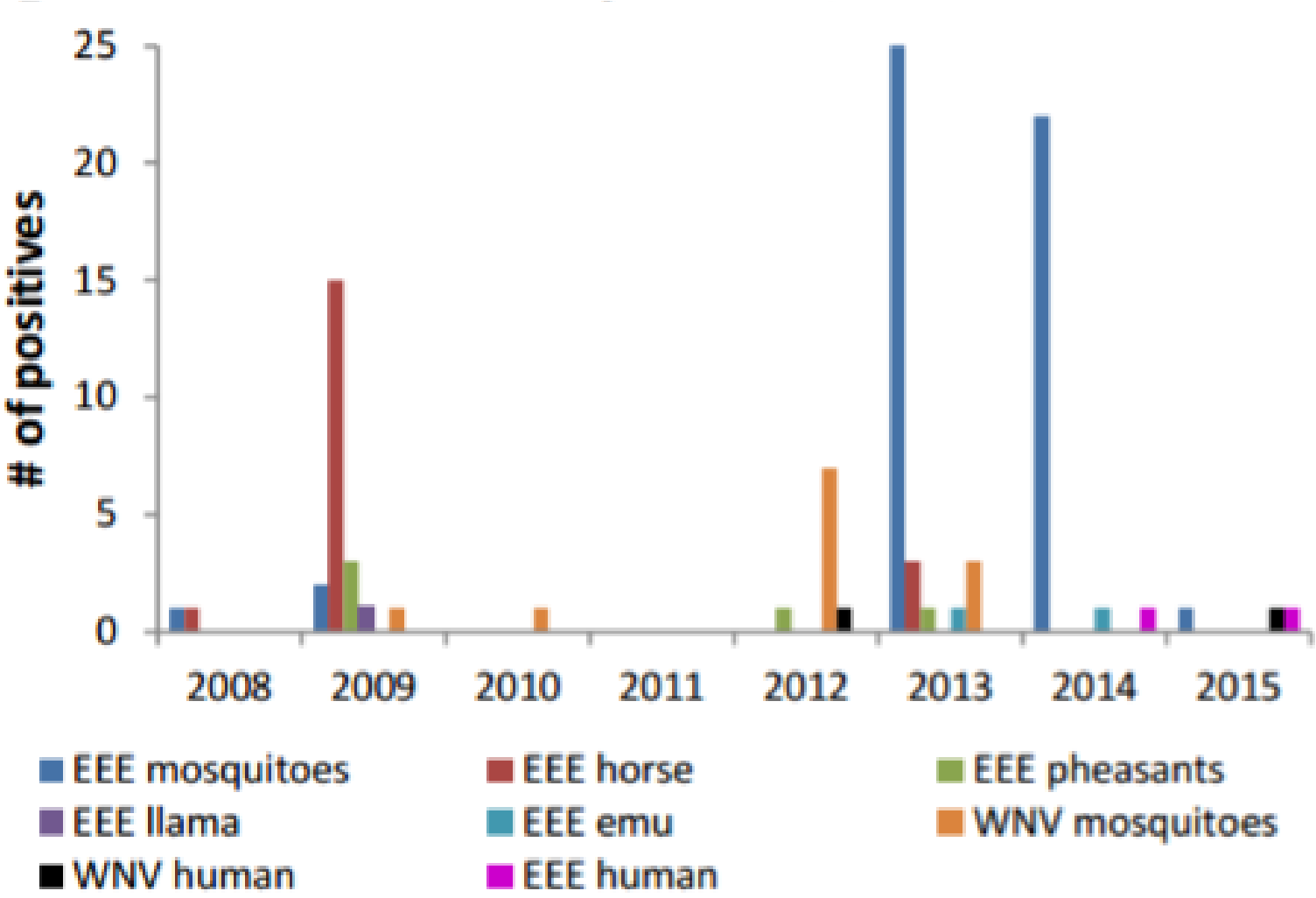
Will add geo-referenced positive mosquito pools to model



Cervid Serosurvey Data



Will add veterinary and human data to model too



More Tools for Modelling

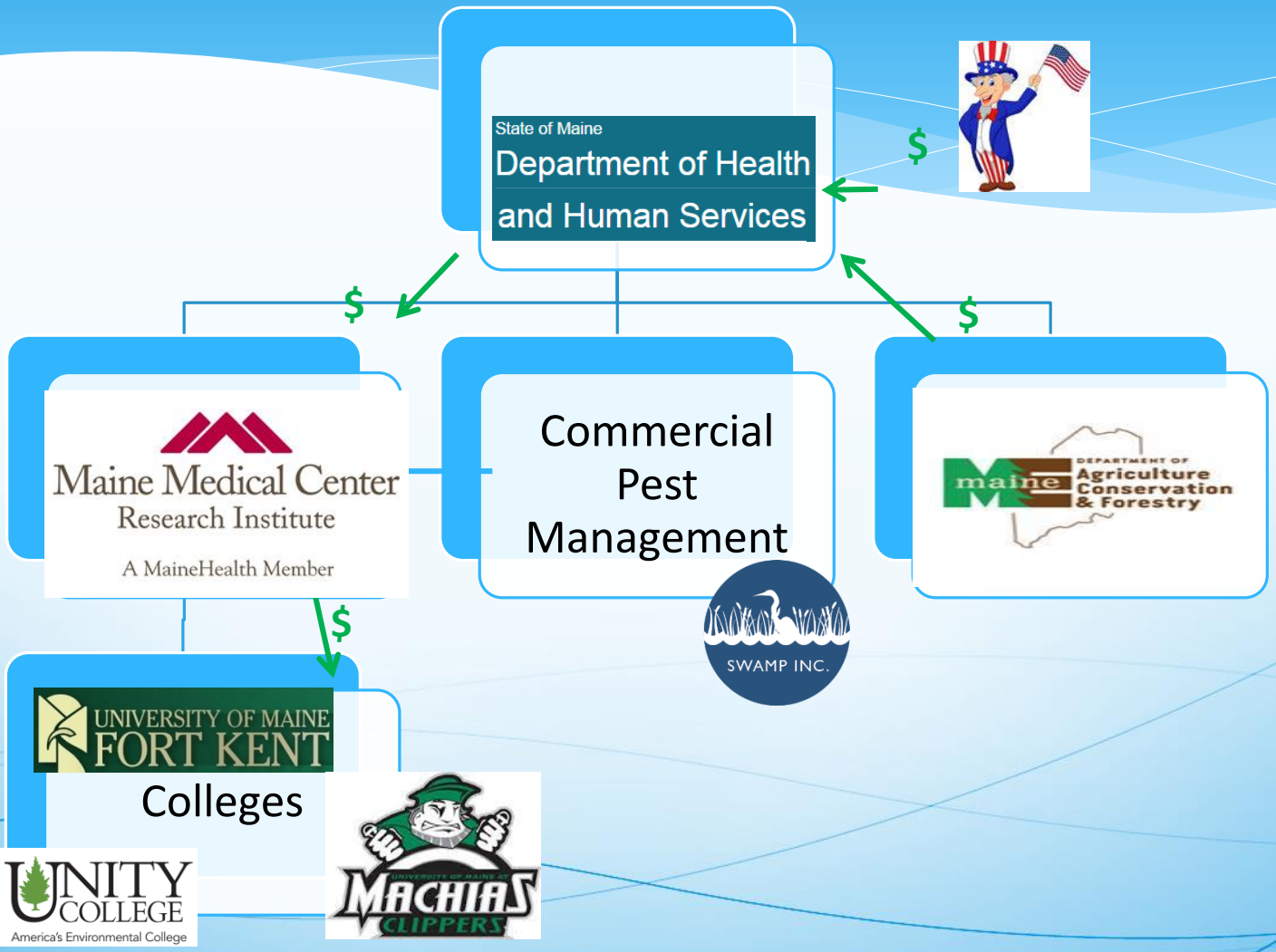
Normalized Differential Vegetation Index (NDVI) – quantify canopy cover

Species Habitat Modelling

Response Planning

* Provide guidance for municipalities
* Public education
* Prepare for state-level response
  * Establish chain of command
  * Train and mobilize people
  * Mobilize equipment
  * Intensify and/or expand mosquito surveillance
  * Obtain permits
  * Implement pesticide application operations

Collaboration



Maine Arbovirus Team

- **Maine Dept of Health and Human Services** State Lab tests mosquitoes for disease. Lead Agency for Vector-borne disease.
- **Maine Dept of Agriculture, Conservation and Forestry**: mapping, mosquito surveillance. Pesticide expertise. Veterinary support. Funding
- **Maine Medical Center Research Institute:** mosquito surveillance and research
- **Municipal Pest Management** (aka Swamp, Inc). Mosquito surveillance and management
- **University of Maine**: research
- **Vector-borne Working Group**: bimonthly meeting to share and plan. Committees for wildlife, education, outreach.