

Emerald Ash Borer Update

Colleen Kenny

Forest Health Planner- MD DNR Forest Service

November 26, 2019





Woodpecker damage



Colleen Kenny, MD DNR Forest Service



Kenneth R. Law, USDA APHIS PPO, bugwood.org

Crown dieback



Colleen Kenny, MD DNR Forest Service



Leah Bauer, USDA Forest Service Northern Research Station, bugwood.org

Exit holes



5471783

Kenneth R. Law, USDA APHIS PPQ, bugwood.org



Emerald ash borer exit holes

Daniel Herms, The Ohio State University, bugwood.org



Ash/lilac borer exit holes

Dave Cappaert, Michigan State University, bugwood.org

Serpentine galleries



Troy Kimoto, Canadian Food Inspection Agency, Bugwood.org

Bark splitting



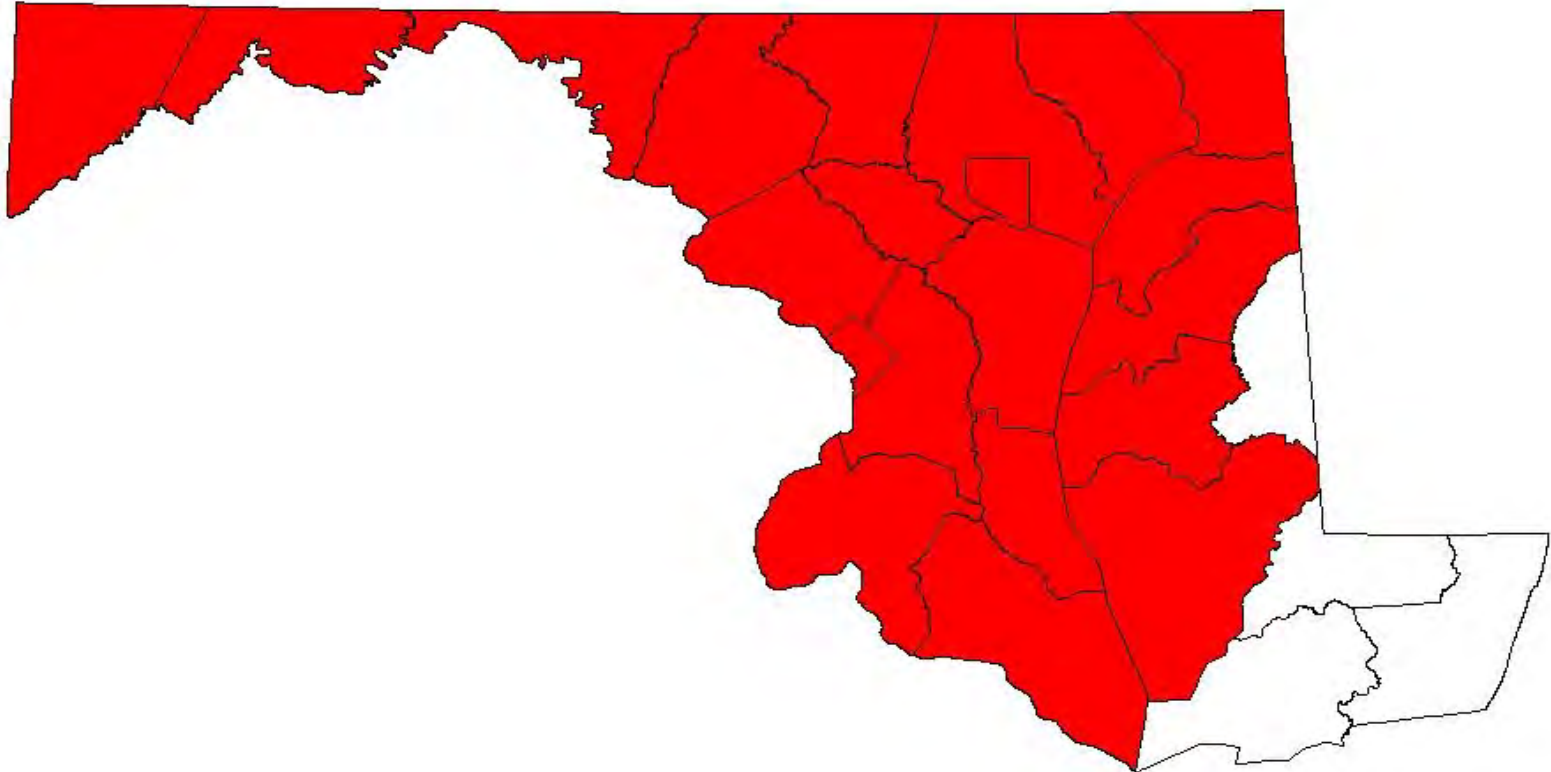
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Epicormic sprouting

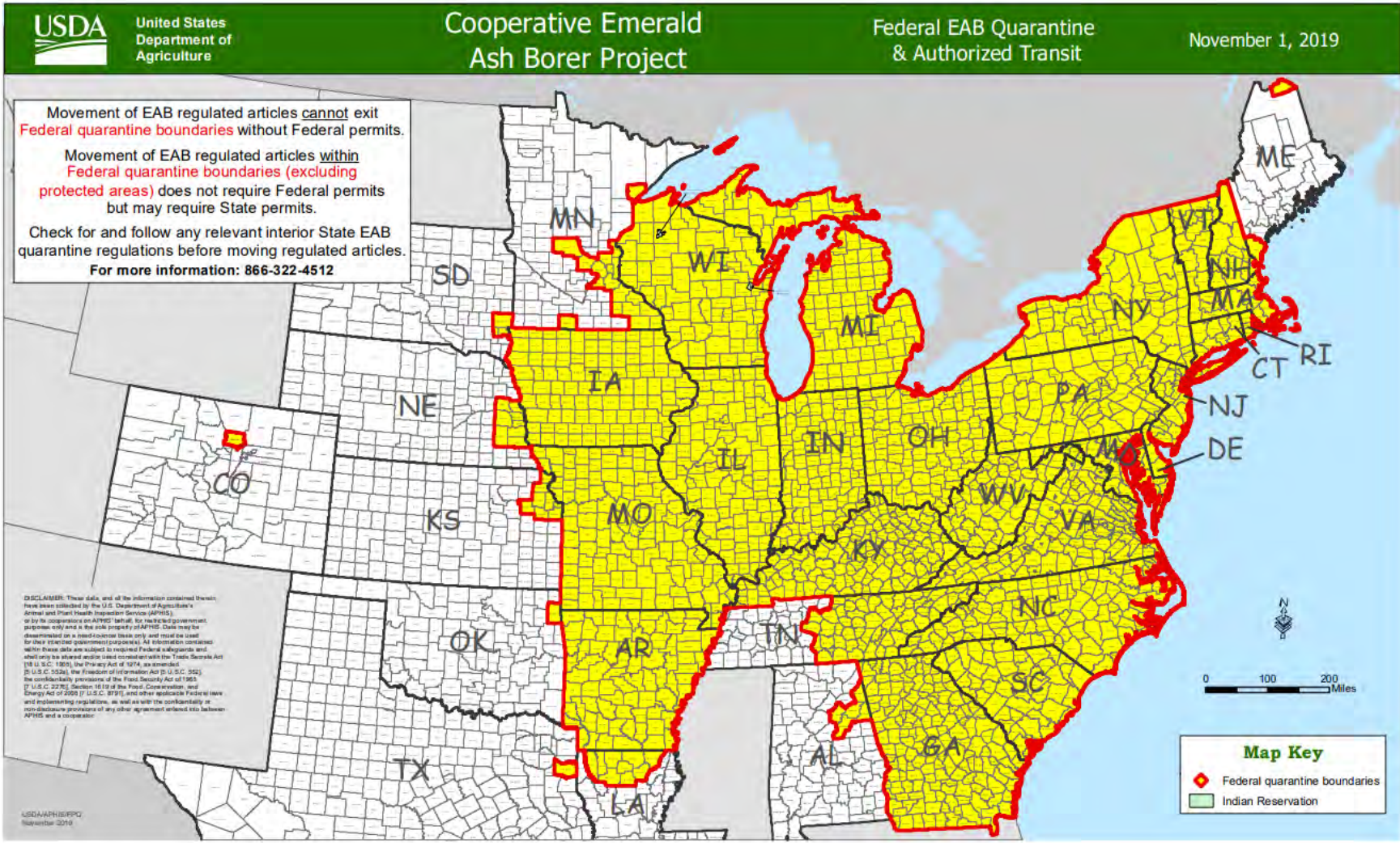


PA DCNR- Forestry Archive, bugwood.org

Distribution



Federal Quarantine



- Untreated ash material
- All species hardwood firewood

Regulatory Changes

- Proposed rule to de-regulate EAB
- Remove federal quarantine
 - Other pest or state/local quarantines remain in place*
- Put more funding towards biocontrol

Direct Impacts

- Mortality within 1-3 years
- Nearly 100% mortality unless treated
- Attacks trees as small as 1" diameter
- Ash snap



Aaron Cook, MD DNR Forest Service

Impacts to other species

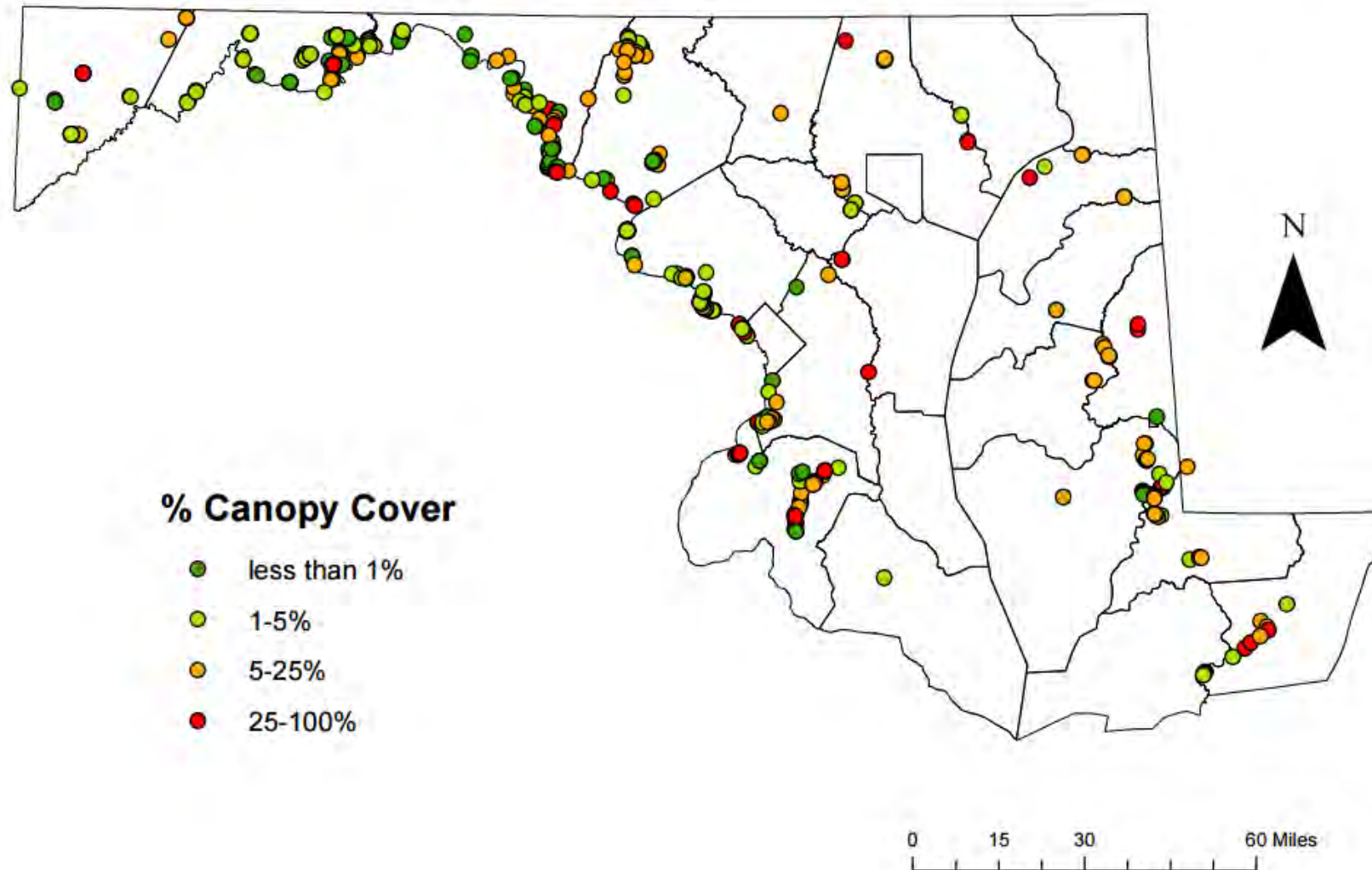
- Ash is an obligate host for ~16 insects and other invertebrates in MD
- Food and habitat source for many other species



UGA3067034

James Solomon, USDA Forest Service, bugwood.org

MDNHP Plot Locations and estimated Canopy Coverage of Ash (*Fraxinus* spp.)

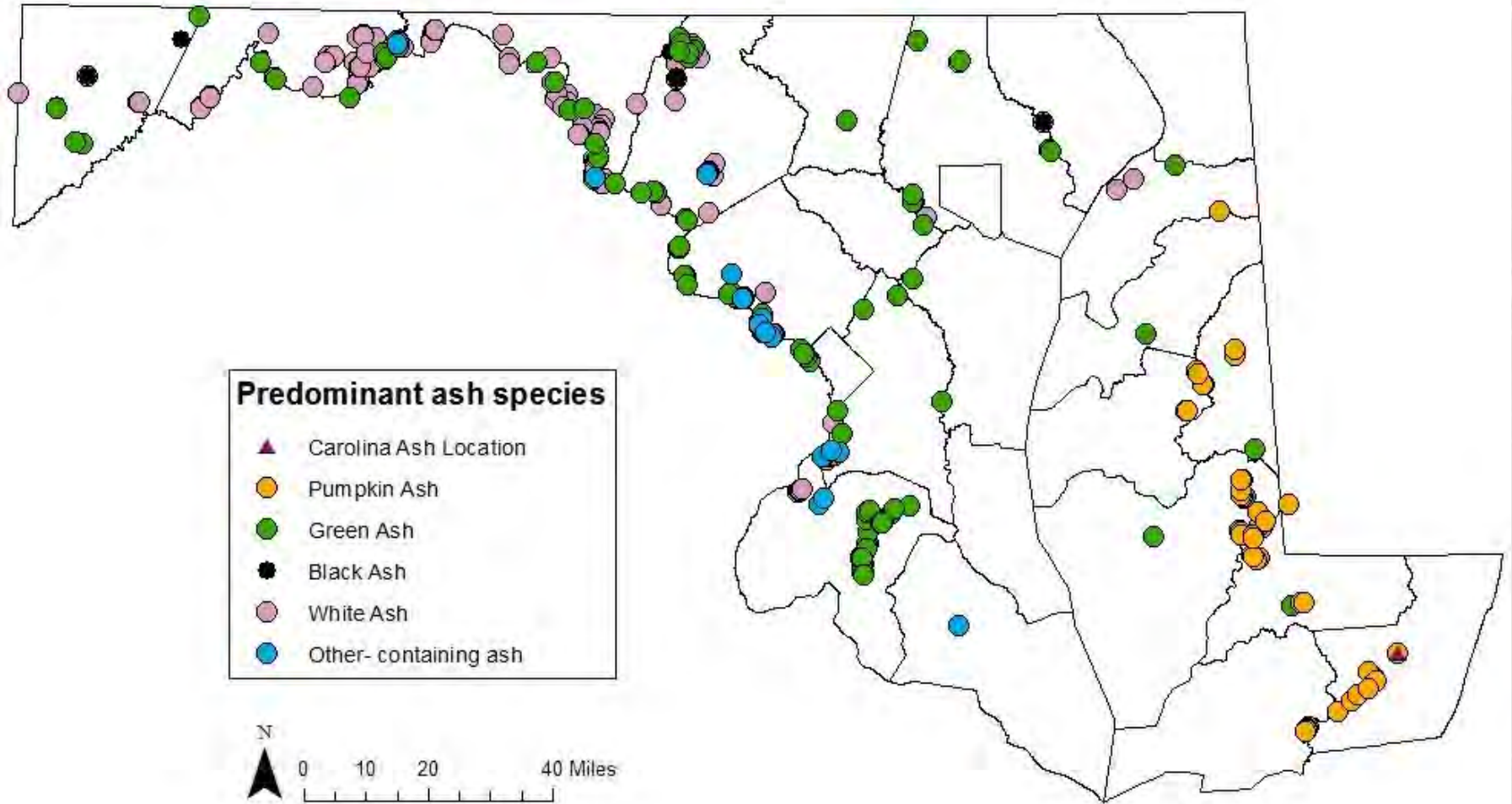






Rare species:

- Black ash
- Pumpkin ash
- Carolina ash



Chemical treatment

- Emamectin benzoate (common brand name Tree-Age)
- Effective for 2-5 years
- Costs \$10-20/diameter inch
- Treat in mid Spring



Treatment in developed areas

- <30% dieback
- Good condition
- Large
- Important value



Tyler Wakefield, MD DNR Forest Service

Urban Management

- Ash is a common street and park tree
- Assistance to local governments
 - *Ash tree inventory*
 - *EAB management plan*
 - *Outreach and funding*

DNR and local government totals:

- *Inventoried: 19,448 ash*
- *Treated: 2,844 ash*



LOCATION	INVENTORIED	TREATED
Allegany Fairgrounds	78	36
Arnold	250	
Baltimore City	3334	416
Baltimore County Public Schools	1289	
Baltimore Zoo	99	99
Bowie*	129	
Cape St. Claire	0	
Catonsville	779	
Chestertown	30	11
Cockeysville	33	
College Park*	94	
Crofton	222	
Cumberland	76	6
Dundalk/Essex	~100	
Easton	199	18
Emmitsburg	76	5
Frederick*	600	630
Greater Upper Marlboro*	596	
Hagerstown	363	92
Havre de Grace	52	27
Howard County*	3400	1400
Jug Bay/ Glendening	81	81
La Plata	380	
Millersville	15	
Montgomery County*	7200	53
Odenton	259	
Parole	157	
Pasadena	187	
Queenland*	70	
Severn	0	
Severna Park	188	
Snow Hill	31	
Thurmont	276	29
Upper Marlboro*	0	
Waldorf	138	
Westminster	56	53

* Survey work completed by other groups or jurisdictions

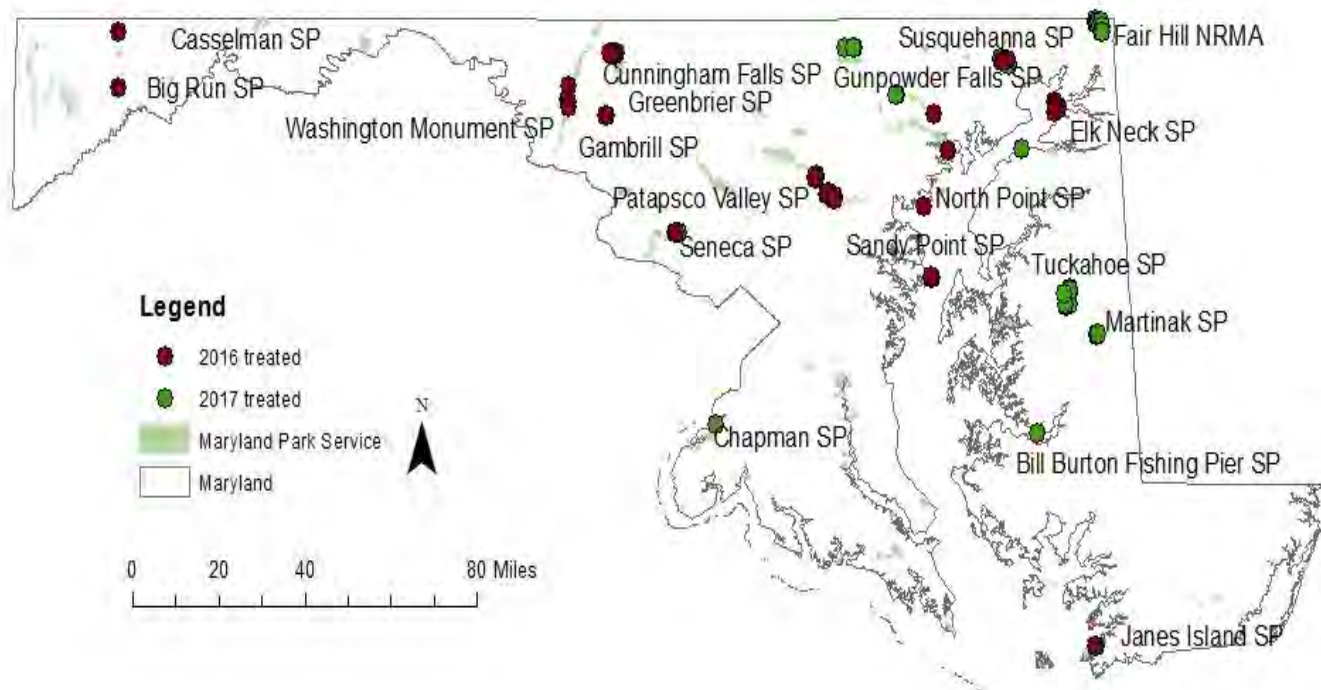
Delmarva Highways

- High densities of ash on the Eastern Shore
- Could impact evacuation routes
- Inventoried 1871 trees in DE, MD, VA
- Majority along water



State Parks

- Ash important for public safety, aesthetics, ecosystem value
- Inventoried: 3,212
- Treated: 606







Selecting trees for treatment in natural areas

- <30% dieback
- Good condition
- Large/dominant
- Ecosystem value
- Treat clusters of male and female trees



Colleen Kenny, MD DNR Forest Service

Tidal Hardwood Communities

Diversity

Hummock and hollow topography

Tidal inundation

RT&E species

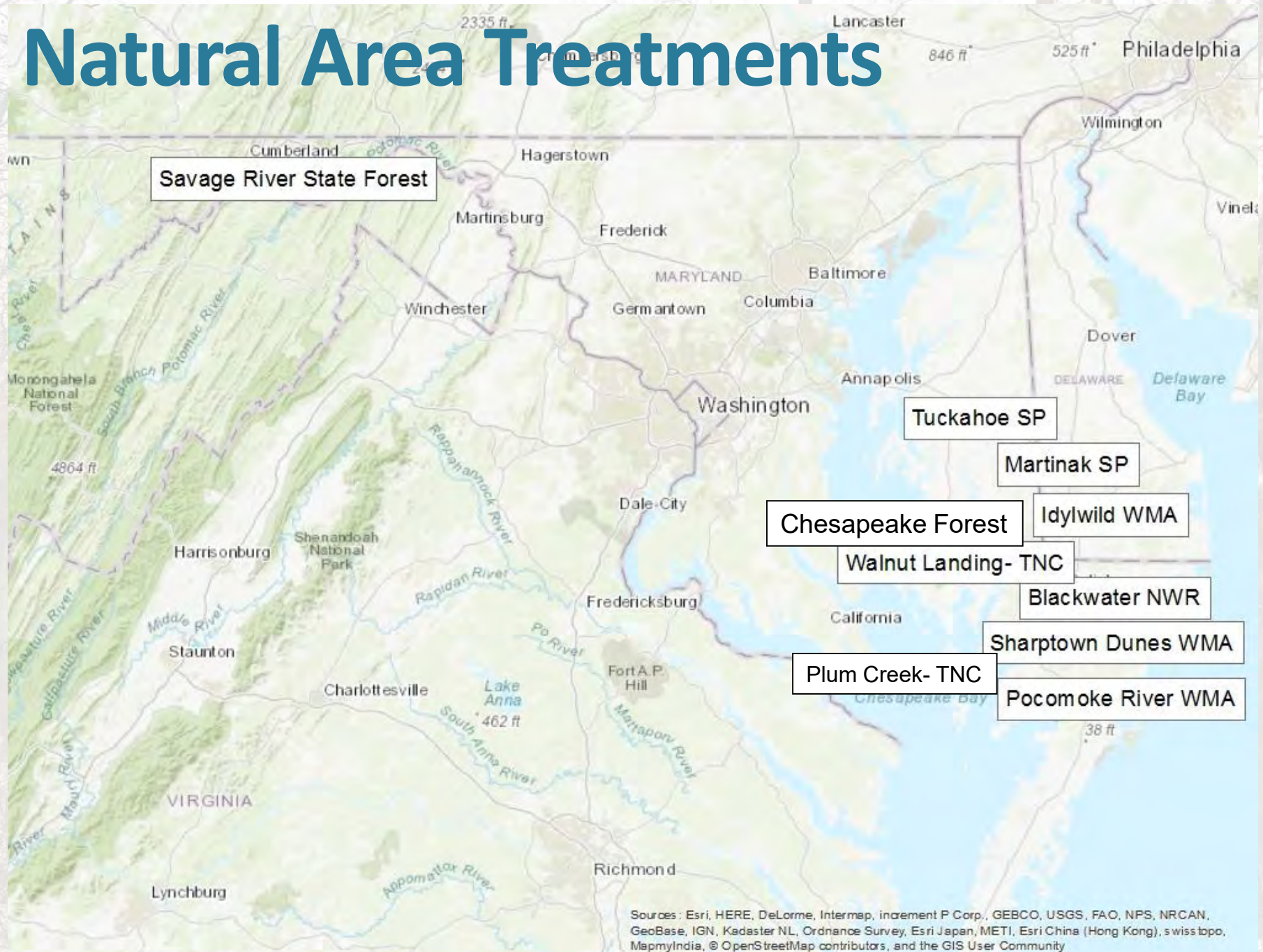
Conservation of communities as umbrella

Hummock and Hollow





Natural Area Treatments



Sources : Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swiss topo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community















How old is this tree?



Underplanting Trials





Biocontrol: control a pest population using its natural enemies

- *Tetrastichus planipennisi*

- Larval Parasitoid



- *Oobius agrili*

- Egg Parasitoid



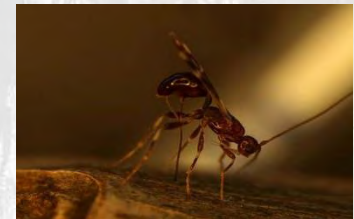
- *Spathius agrili*

- Larval Parasitoid



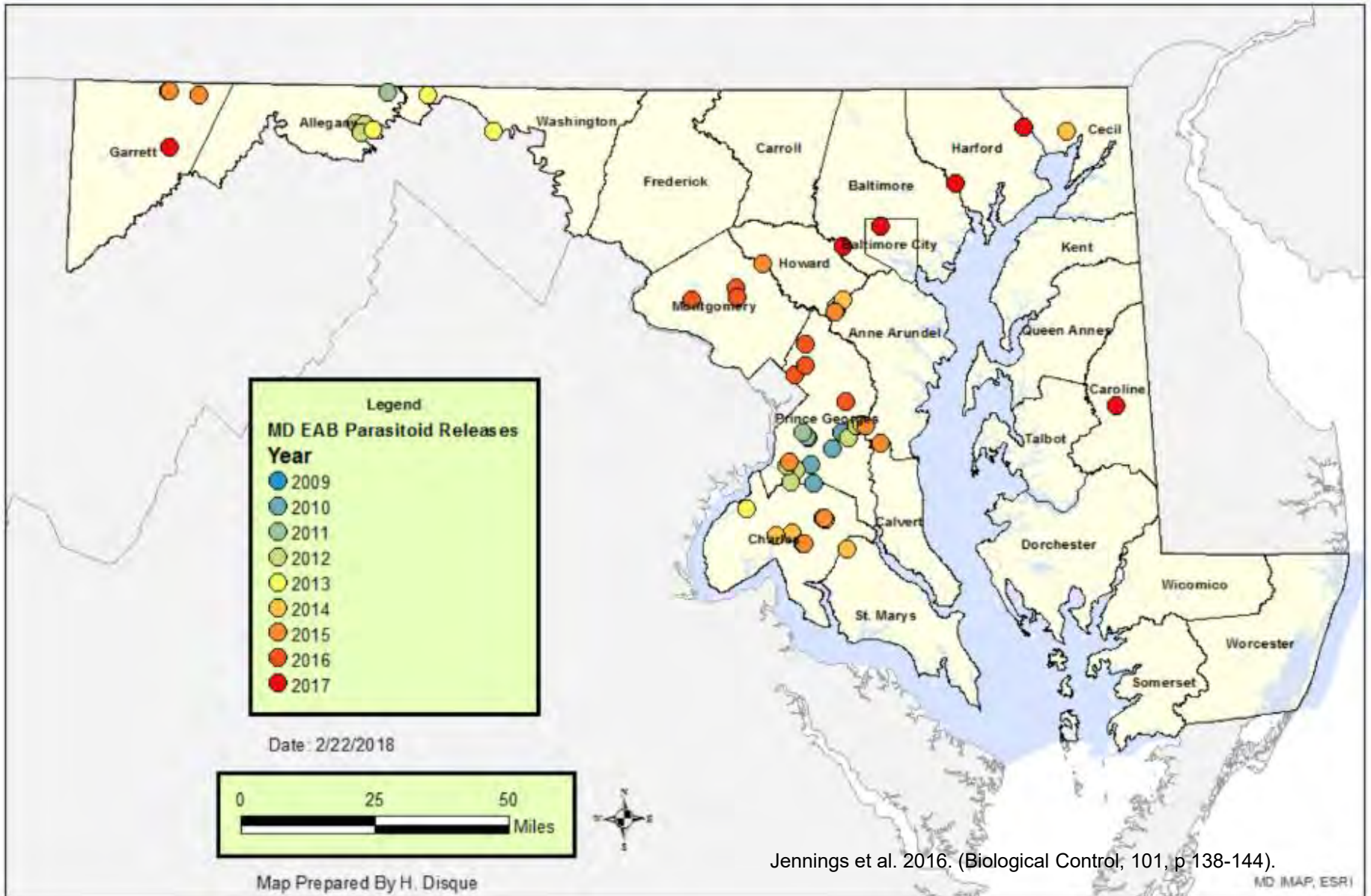
- *Spathius galinae*

- Larval Parasitoid

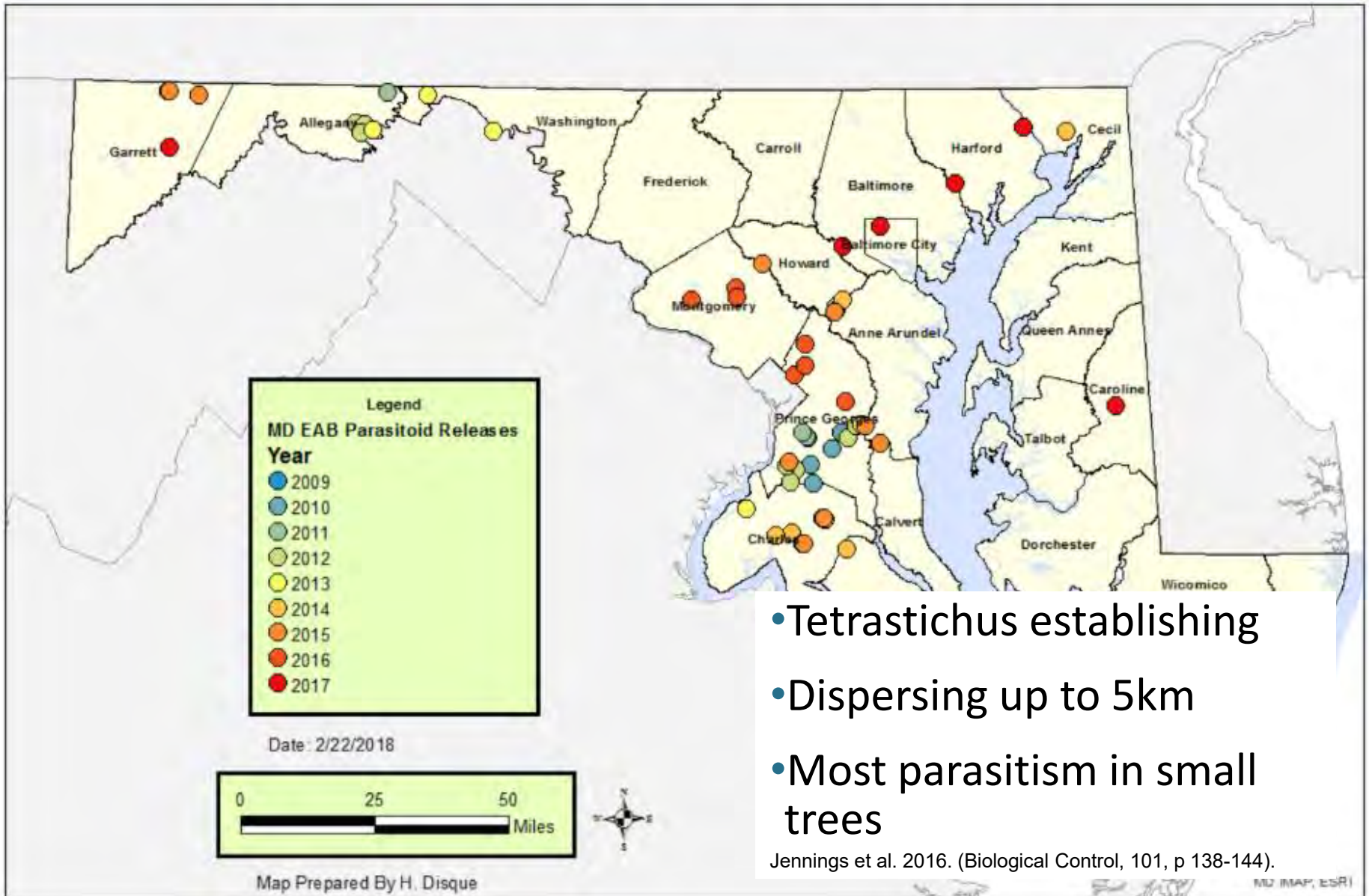


Maryland Department of Agriculture Historical EAB Parasitoid Releases

Forest Pest Management, Plant Protection Sections; UMD; USDA BIIRL



Maryland Department of Agriculture
Historical EAB Parasitoid Releases
Forest Pest Management, Plant Protection Sections; UMD; USDA BIIRL

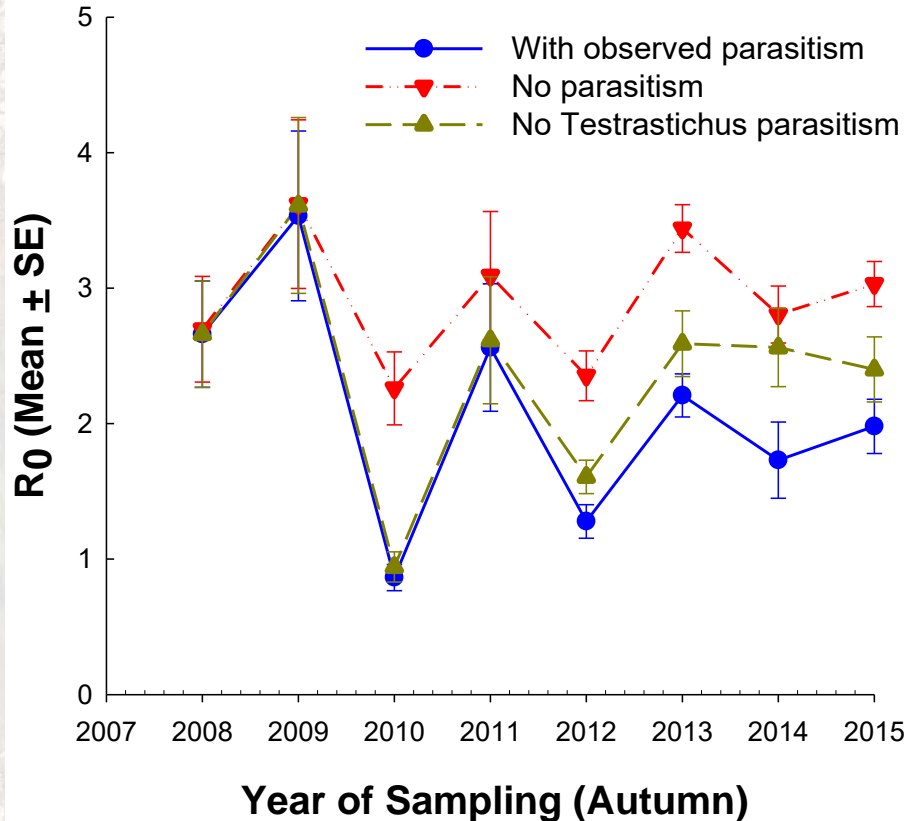


- Tetrastichus establishing
- Dispersing up to 5km
- Most parasitism in small trees

Jennings et al. 2016. (Biological Control, 101, p 138-144).

Michigan biocontrol study

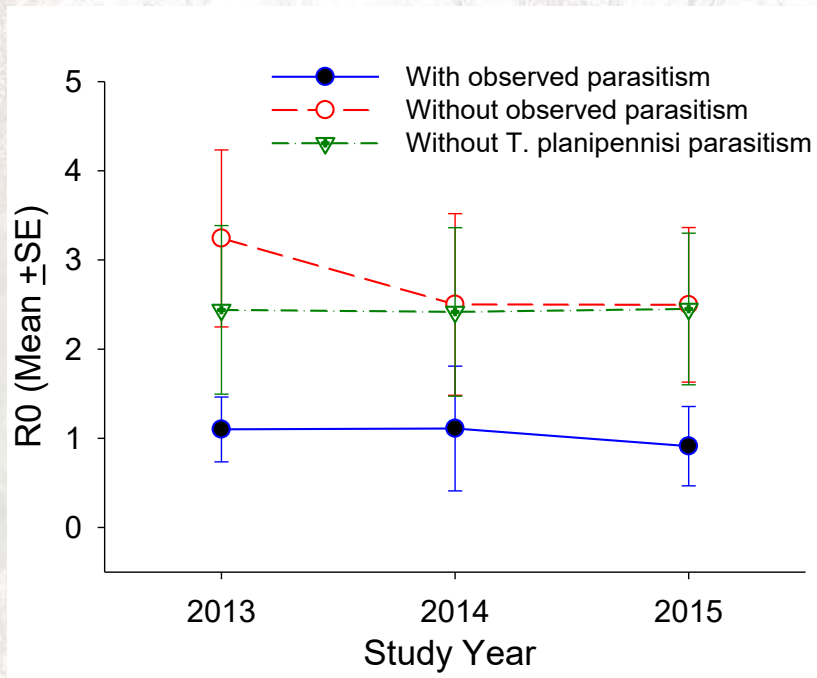
Large trees (7-21 cm)



- *Tetrastichus* parasitism reaches 20%
- EAB population still growing, but more slowly

Michigan biocontrol study

Small trees (2.5-5.8 cm)



- Tetrastichus parasitism reaches 80%
- EAB population declining

Bottom line:

- Populations establishing
- Not able to protect trees yet
- Useful as a long term strategy



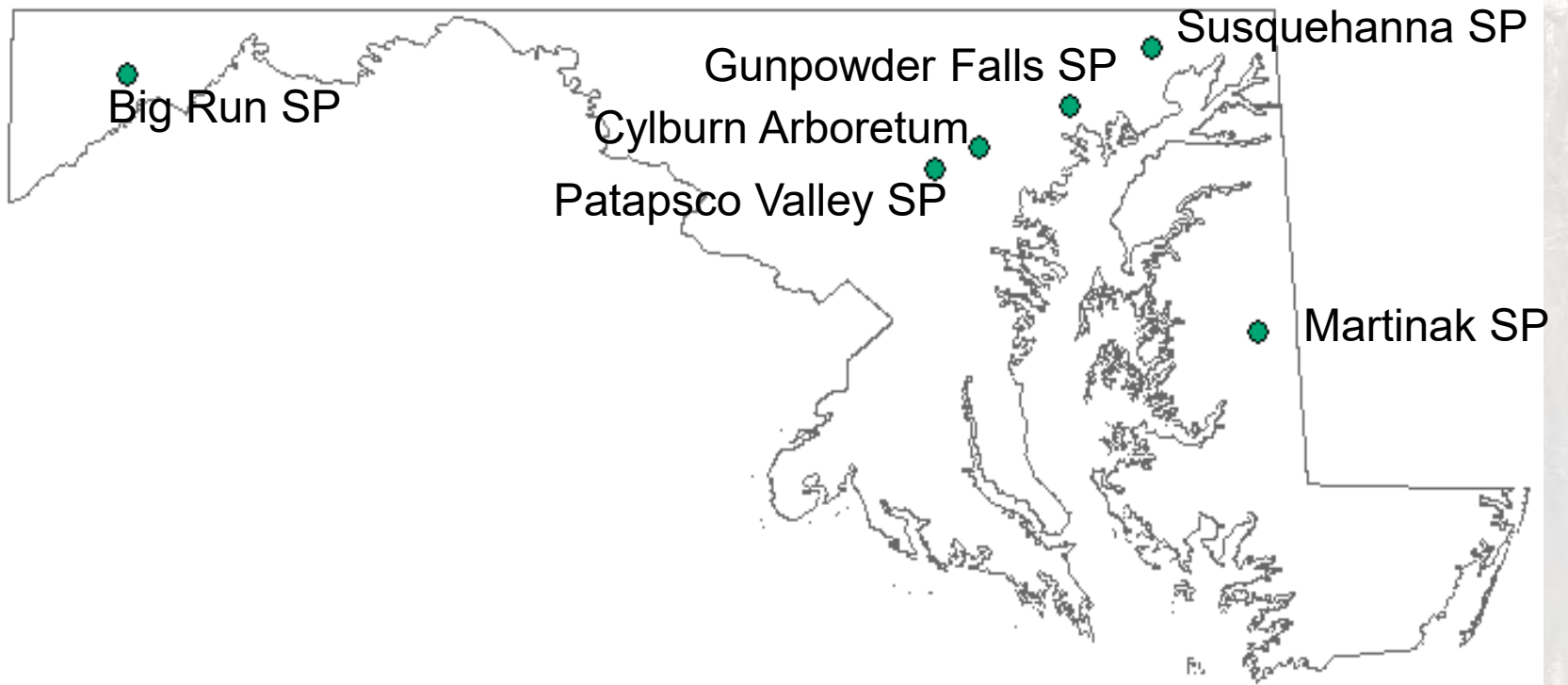
T. planipennisi. Bill McNee, Wisconsin Dept. of Natural Resources, Bugwood.org

IPM Approach

- **Treat:** protect large trees, seed sources, trees important for safety
- **Release:** develop long term population control



Dawn Miller, MD DNR Forest Service



Genetic Research

Seed Collection

- Rare species and unrepresented ecosystems

Lingering Ash

- Greater than 10 cm dbh
- In stands with >95% mortality due to EAB
- If you find these trees- let us know!



Keith Kanoti, Maine Forest Service, Bugwood.org

5349064

Tidal Wetlands Study

- University of Maryland- Andy Baldwin
- Changes in vegetation, structure, hydrology, etc.
- Planting trials
 - Site inundation
 - Position on hummocks
 - Species: Atlantic white cedar, bald cypress, overcup oak, etc.

General Outlook

- Treatment for at least next 10 years
- Large scale- EAB and ash populations should crash and linger at lower levels
- Small trees might stick around
 - Re-sprouting and biocontrol
 - Seed source treatments
 - Orphaned cohorts?
- Larger trees
 - Treatments
 - *Spathius galinae*?
- Restoration- resistance and breeding

Questions?

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