HWA SURVEY TRAINING

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WHAT QUESTIONS DO YOU HAVE THAT YOU ARE HOPING TO GET ANSWERED TODAY?

TODAYS SCHEDULE

- Welcome and Introductions

- What is HWA

- Introduction to Coordinating Committee and Survey Working Group

- Current Work in Michigan

- Survey Methods and Tools

- Review of Collector App, Data Fields, and Definitions

- Survey 123 App Development and Use

- Lunch

- Site Visits to Hoffmaster State Park and Elks Properties

- Identification and Survey Methodology Overview

HEMLOCK WOOLLY ADELGID: WHAT IS IT?

- Hemlock woolly adelgid (HWA) is a tiny, invasive insects native to Japan.

- HWA can be found feeding at the base of needles where the adelgids attach to woody shoots and are best seen on the underside of a branch.
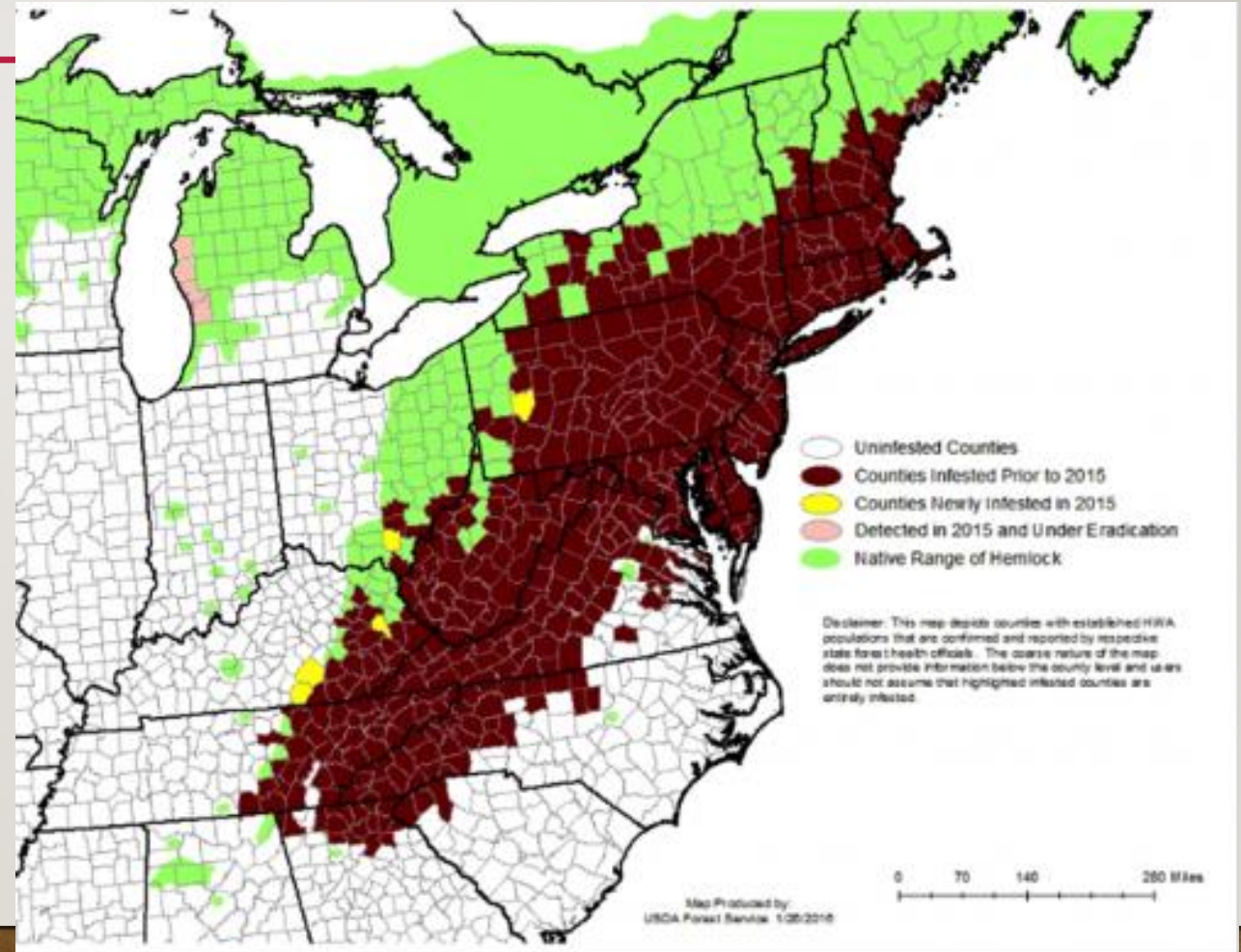
HWA

- **2 generations per year**

- Crawlers are present in ~April and July

  - mobile

  - tiny

  - spread easily on the wind or hitchhike unseen on birds, animals and humans.
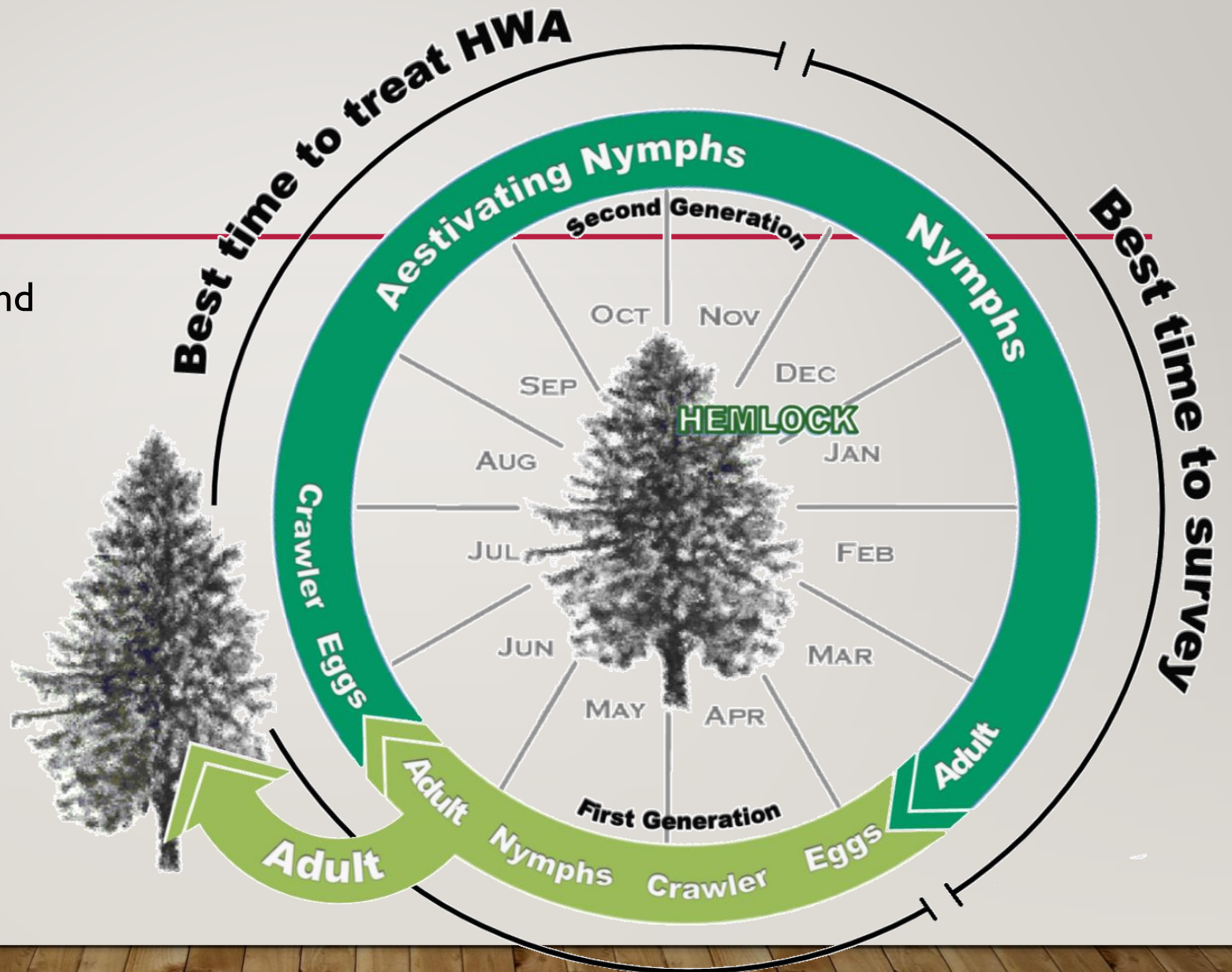
HEMLOCK WOOLLY ADELGID: WHAT IS IT?

- HWA has spread to 16 states, from Georgia to Maine– now including Michigan.

HWA is currently spreading in Michigan!

Uninfested Counties
Counties Infested Prior to 2015
Counties Newly Infested in 2015
Detected in 2015 and Under Eradication
Native Range of Hemlock

Disclaimer: This map depicts counties with established HWA populations that are confirmed and reported by respective state forest health officials. The coarse nature of the map does not provide information below the county level and users should not assume that highlighted infested counties are entirely infested.

Map Produced by:
USDA Forest Service 1/26/2016

0   70   140   280 Miles

USDA Forest Service, 2016

HWA: identify

LOOK ALIKES

- There are several 'look-alikes' that surveyors should be aware of:
  - Spittlebug
  - Oak skeletonizer cocoons
  - Hemlock needle miner
  - Hydro-seed mulch
  - Drier Lint
  - Drops of pine/spruce sap
  - Spider eggs sack
  - Elongate hemlock scale

HGIC, U of MD

Elongate Hemlock Scale

Joe Boggs, OSU Extension©

Armored scale insect pest of hemlock *(also invasive!)* Causes premature needle drop, limb dieback, overall decline or death

Main Symptoms:
Yellowing needles
Stunted needle growth

NOT TO BE CONFUSED WITH:

Spider Egg Sacks

D. Ouelette, ME - FS

J. Hingston, VT FPR

Oak Skeletonizer

D. Ouelette, ME - FS

Hemlock Needleminer

CT Agricultural Expt Station, Bugwood.org   UGA1178011

Steve Norman, U.S. Forest Service
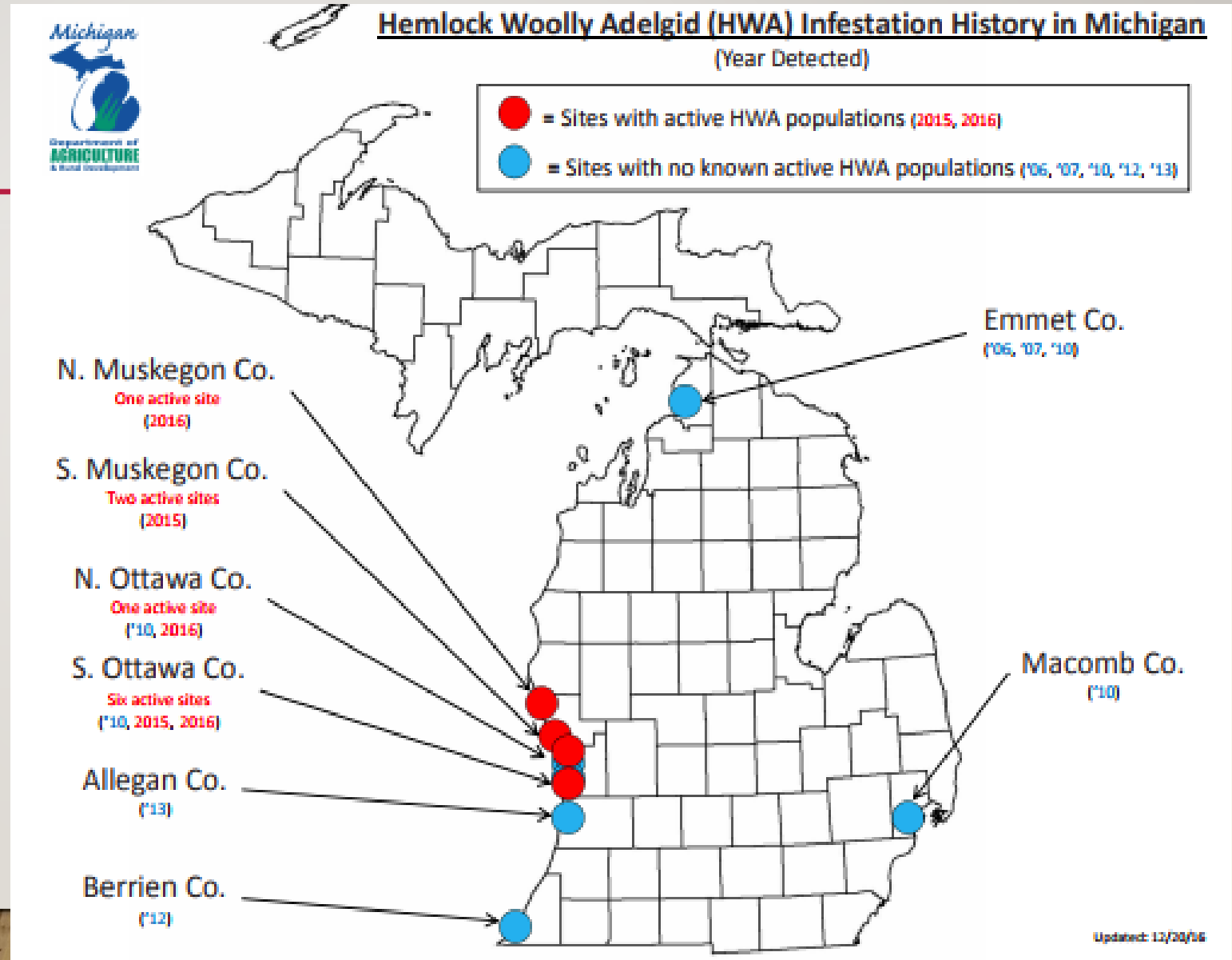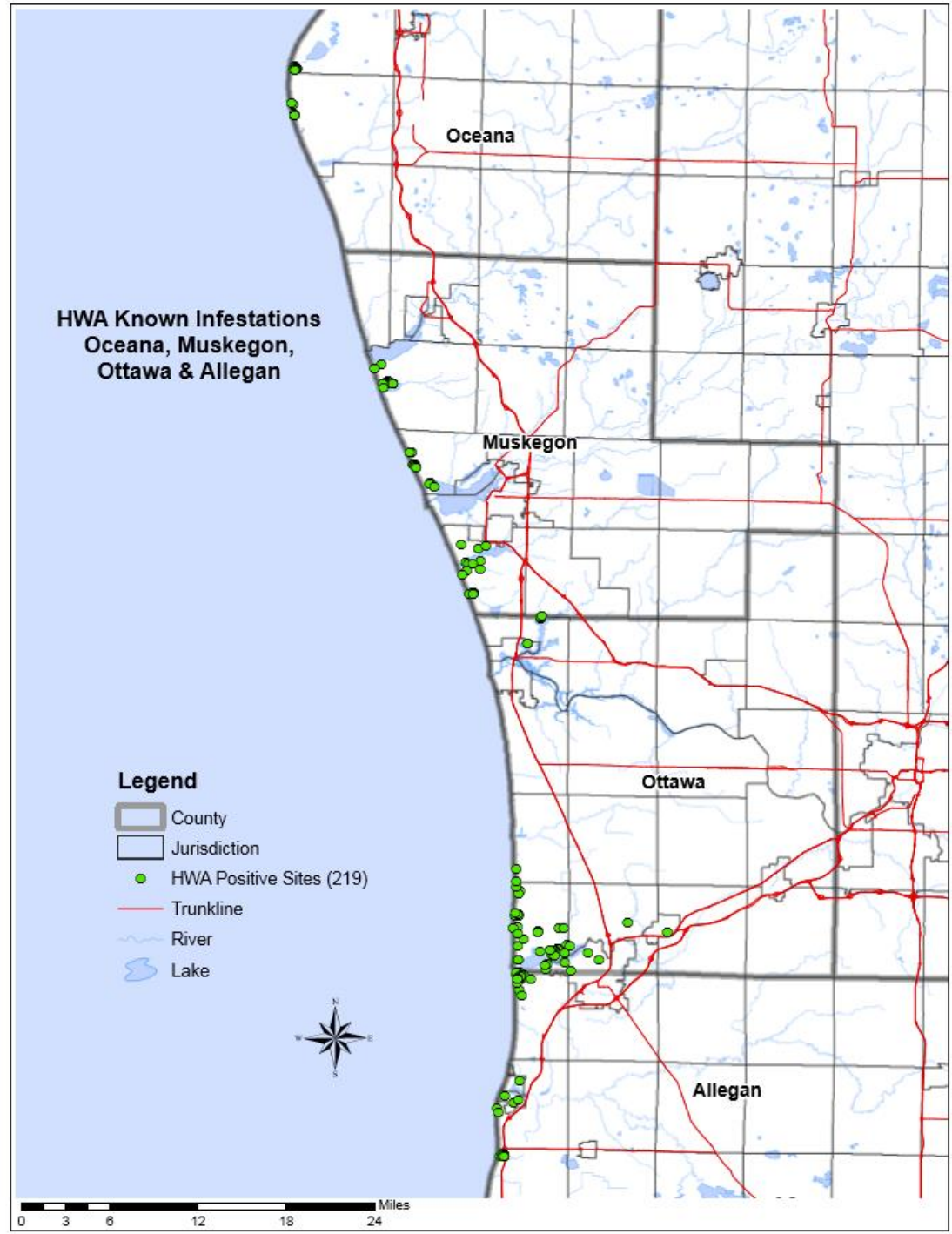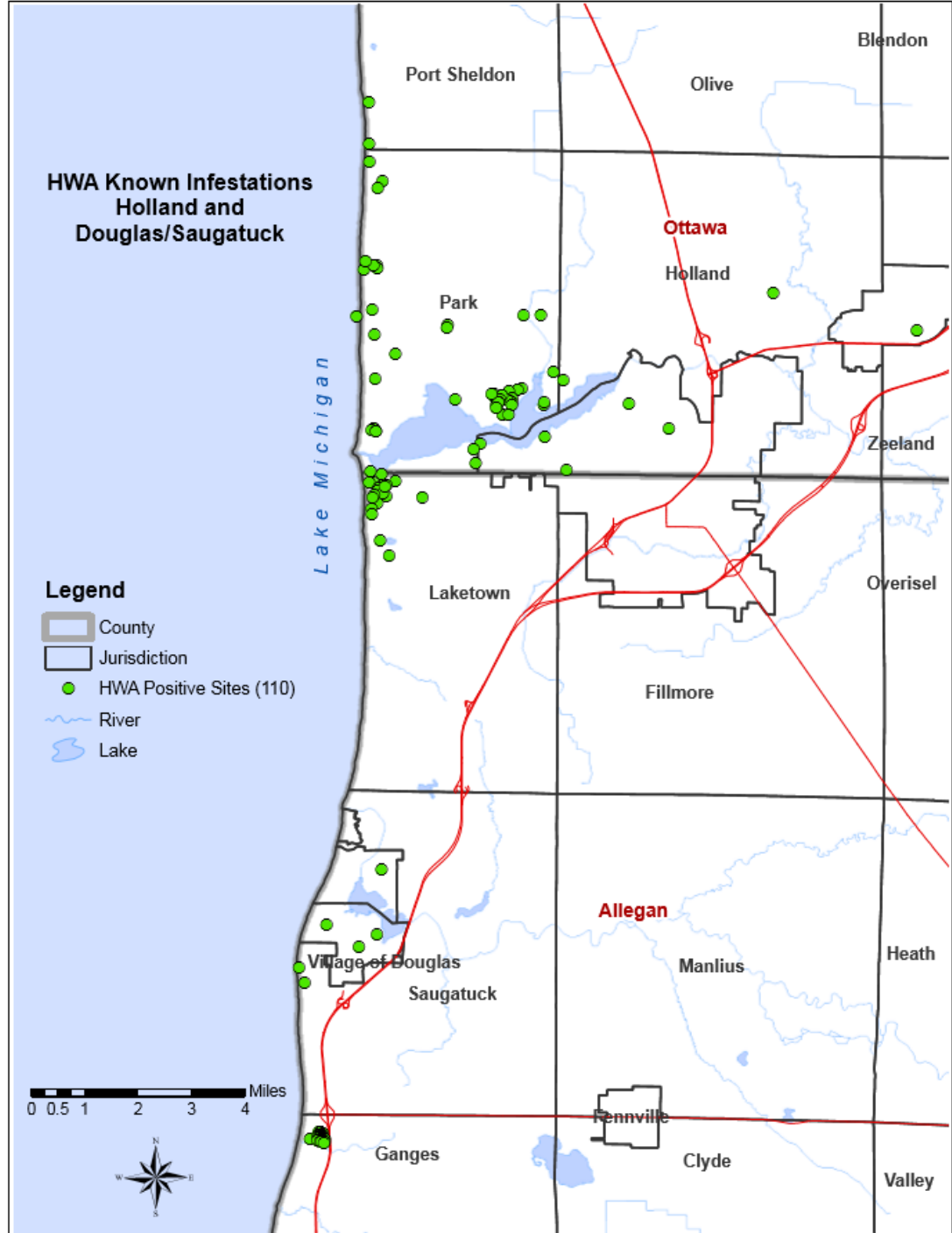
CURRENT RANGE IN MICHIGAN

COMPILING DATA

- State of Michigan Parks

- MISIN Reports

- Reports Directly to MDARD

- Consulting Companies (some sites already have been treated)

- West Michigan Task Force

HWA: the extent

Map showing HWA infestation history in Michigan. Year listed is the year infestation was detected. **Shows sites with active infestations in red while eradicated sites are shown in blue.**

Hemlock Woolly Adelgid (HWA) Infestation History in Michigan
(Year Detected)

● = Sites with active HWA populations (2015, 2016)

● = Sites with no known active HWA populations ('06, '07, '10, '12, '13)

Emmet Co.
('06, '07, '10)

N. Muskegon Co.
One active site
(2016)

S. Muskegon Co.
Two active sites
(2015)

N. Ottawa Co.
One active site
('10, 2016)

S. Ottawa Co.
Six active sites
('10, 2015, 2016)

Allegan Co.
('13)

Berrien Co.
('12)

Macomb Co.
('10)

Updated: 12/20/16
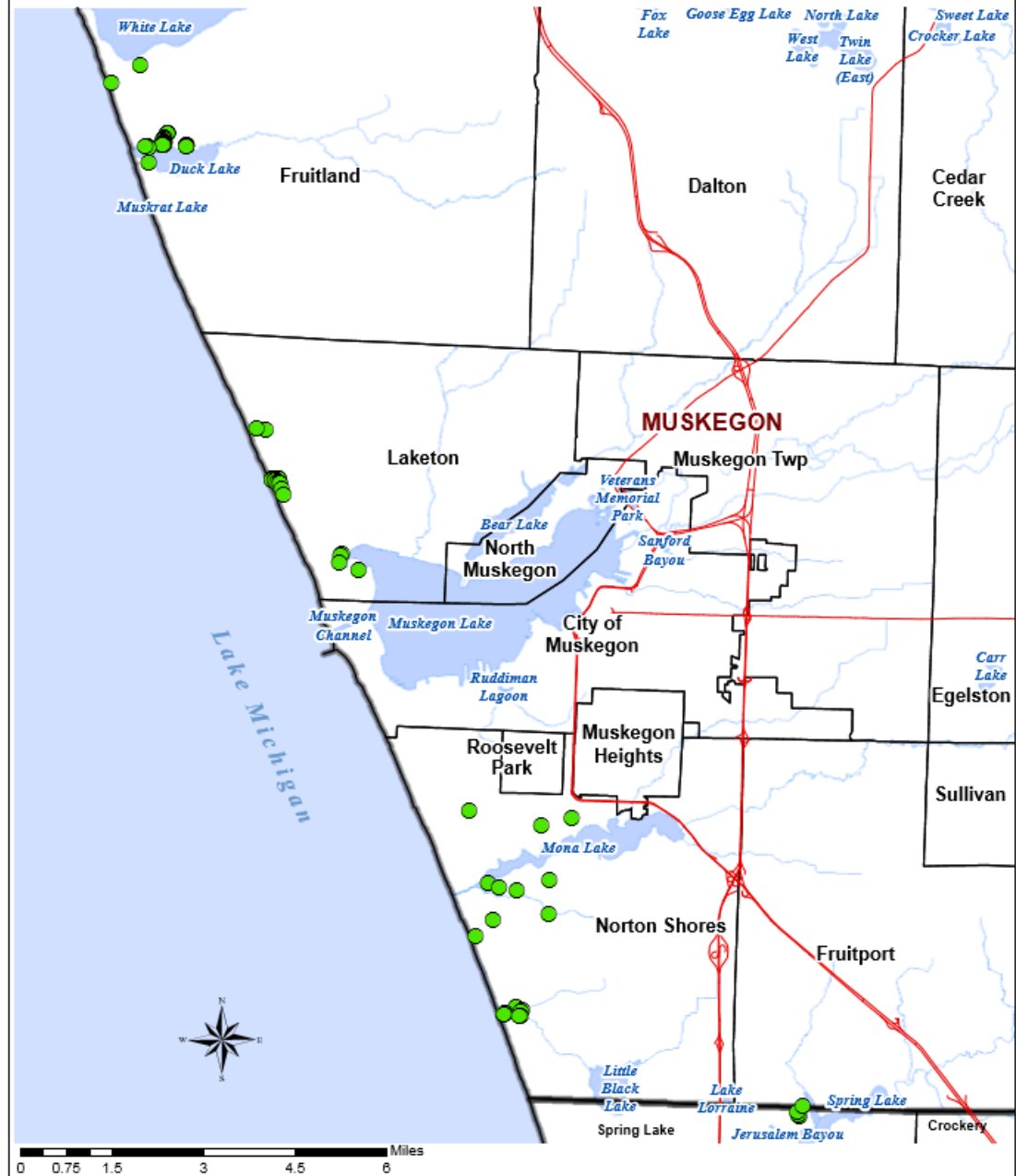
HWA Known Infestations
Oceana, Muskegon,
Ottawa & Allegan

Oceana

Muskegon

Ottawa

Allegan

Legend

County
Jurisdiction
○ HWA Positive Sites (219)
— Trunkline
River
Lake

Miles
0   3   6   12   18   24

HWA Known Infestations
Holland and
Douglas/Saugatuck

Legend
County
Jurisdiction
● HWA Positive Sites (110)
River
Lake
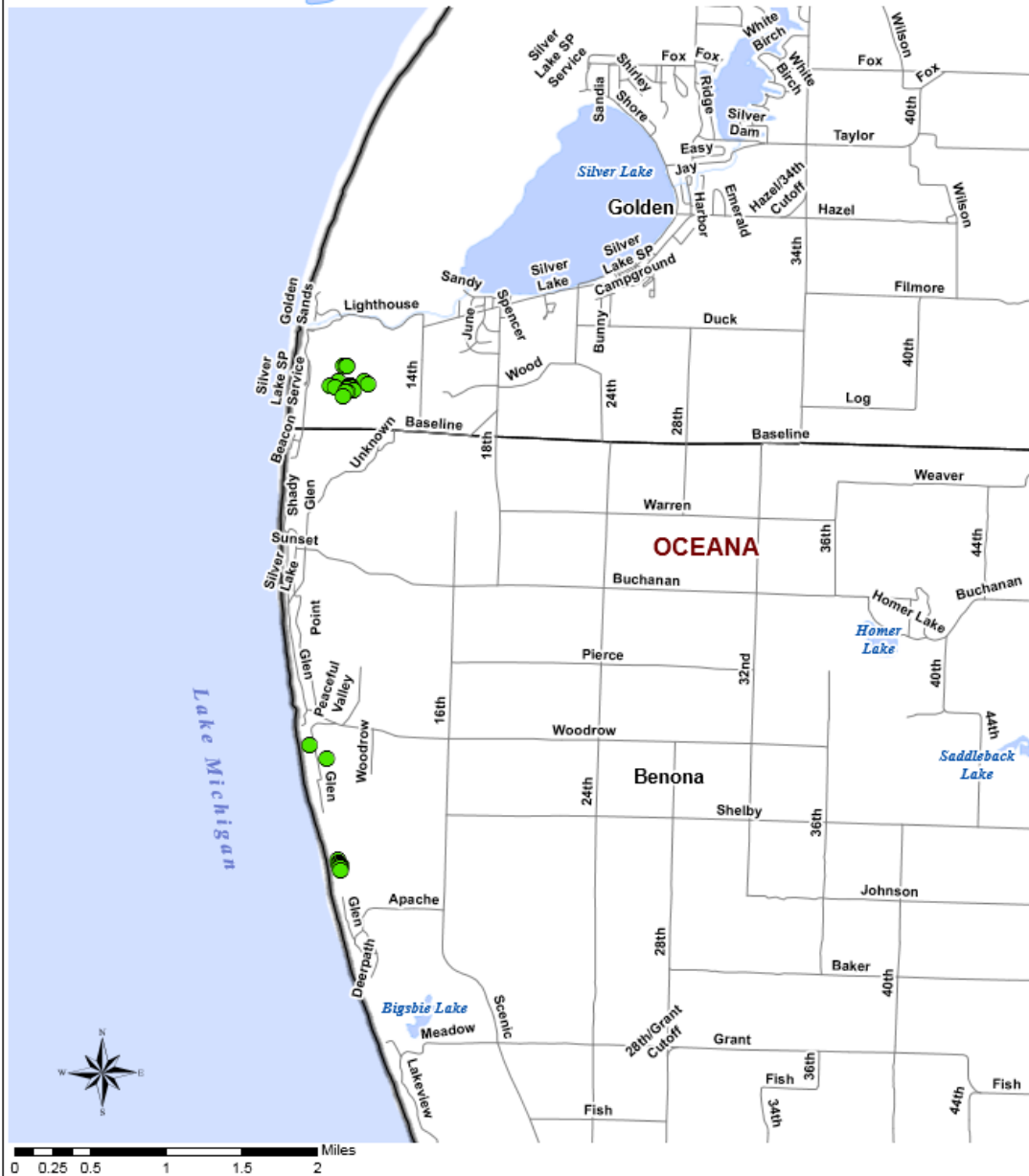
HWA COORDINATING COMMITTEE

- HWA State Management Strategy
  - Google "Protecting Michigan's Hemlock Resource by Responding to Hemlock Woolly Adelgid"
  - August 30 2017 is most recent draft
- Main Focuses
  - Prevent
  - Detect
  - Manage and Use Field Data
  - Implement Insecticide Treatments
  - Conduct Research
  - Establish Long-Term Funding

SIX COMMITTEES

- SURVEY

- TREATMENT

- DATA MANAGEMENT

- OUTREACH

- BIOCONTROL

- RESEARCH

SURVEY SUBGROUP

- Led by Greg Norwood with the Michigan DNR

- Organization Represented
  - DNR Wildlife Division
  - DNR Parks Division
  - DNR Forest Resources Division
  - USFS
  - Ottawa Conservation District/West Michigan CISMA
  - TNC
  - MSU

SURVEY SUBGROUP

- Tasked with coming up with HWA survey methods for entire State of Michigan

  - Including areas of current infestations as well as non-infested areas

- Working to inform Data Management Subgroup of data needs

- Met several times and have drafts of documents at this point

CURRENT WORK IN MICHIGAN

CURRENT WORK IN MICHIGAN

- West Michigan CISMA Grants

- TNC Grant

- West Michigan Task Force

- State of Michigan

WEST MICHIGAN CISMA

- GLRI Grant
  - $600,000 given to the West Michigan Shoreline Regional Development Commission (WMSRDC)
  - Roughly $180,000 given to West Michigan CISMA for delimitation surveys
  - Roughly $85,000 given to a contractor (GEI Consultants) for detection surveys
  - Roughly $250,000 to be awarded to a contractor to start treatments

WEST MICHIGAN CISMA

- MISGP Grants
  - Survey Grant
    - $200,000 awarded to the West Michigan CISMA to go towards survey work
  - Treatment Grant
    - $299,400 awarded to the West Michigan CISMA to go towards treatment
- County Money
  - $25,000 given by Ottawa County as start up money for HWA management
  - $15,000 given to the West Michigan CISMA to start compiling data and doing outreach

TNC

- MISGP
  - $363,000 awarded to the Michigan Dune Alliance to do detection surveys along West Michigan coastline
  - Using detection survey protocols and following the guidance of the survey subcommittee to survey high priority and high risk areas along the lakeshore

WEST MICHIGAN TASK FORCE

- Created in December of 2016

- Goal of bringing together partners to address HWA moving forward

- Currently has multiple working groups working to address a variety of issues

STATE OF MICHIGAN

- DNR Parks
  - Surveying and mapping trees at several parks for HWA presence
  - Treating trees at several parks with current infestations
  - Getting additional parks surveyed and MIFI mapping data

DRAFT PROTOCOLS AND DEFINITIONS

BACKGROUND OF HWA SURVEY METHODS

- Goal of the HWA survey subgroup is to create a develop survey methods and train partners to detect and map HWA to lead to treatments to minimize tree mortality in Michigan

- Detection and Delimitation Surveys

DETECTION SURVEYS

- Four circumference boundaries will be set up around each known HWA population at 5, 10, and 20-mile radius
  - High risk areas will be identified and surveyed on these radius
  - New detections will result in new lines being drawn
- Surveys will begin the high risk intersections of the 20-mile radius until all are surveyed
  - Surveys will follow at 10 miles and then 5-mile radius
- Intersection coordinates on the circumference lines are only a guide; surveyor judgement will be required to find an appropriate balance between logistical constraints of accessing trees at specific intersections versus trees near that intersection

DELIMITATION SURVEYS

- Known HWA populations will be delimited by surveying *outwards* from a known population and will us treatment buffer distances for guidance

- Surveyors can survey outward in or can start at the edge of buffers and work your way back knowing that all trees within the area will be treated

HIGH RISK FEATURES

- Major waterways, including lake shorelines and river corridors
- Brush dumps
- Private campgrounds
- Road-ways and trails
- Old trees
- High biodiversity sites
- Rare ecosystems
- High income
- Hemlock located along forest edges (e.g., road-ways, trails, field edges).

HWA SURVEY PROTOCOLS

- Hemlock woolly adelgid survey protocols
  - Meant to be a guiding document to explain survey techniques and data collection in the field
  - If you have questions about reviewing document, feel free to contact one of us more information
  - Hope to have a final draft in the coming weeks

DETECTION SURVEYS

- Used when surveying areas where HWA is not known to be

- Goal is to look at as many trees as possible to detect new HWA infestations

- Not intended to be a hemlock inventory of the stand

- Survey methods will be the same as methods for delimitation surveys

DELIMITATION SURVEYS

- Surveys done within an area known to have HWA present
  - Includes all trees within 800 feet of an infested tree

- Used to collect and document stand information to set up treatments
  - DBH to determine treatment methods and rate with max application rates

- Currently being done by West Michigan CISMA staff in the knowns areas within the four counties

MAIN DIFFERENCES BETWEEN DETECTION AND DELIMITATION SURVEYS

- Survey Techniques
  - Mapping a minimum of 30 trees vs all of the trees
  - Intent of data

- Data Collection
  - DBH size class vs actual DBH
  - Collecting lat/long per tree vs per site
  - Answers for HWA presence/absence

- Can you collect delimitation data during a detection data if you choose?

SURVEY TECHNIQUES

- Strategic random wonder survey
  - Focus on areas of high chance of spread of trees looking to be in a state of decline
  - Wonder transects either N to S or E to W
- Timing
  - Best timing is Jan1 through June 30
  - Crawler April through July
- Goal is to look at as many branches as possible without getting stuck on single trees

SURVEY TECHNIQUES

- Number of trees per site
  - Minimum of thirty trees looked at per acre
  - Trees should be spread out throughout the acre and represent the acre as a whole
  - If less than 30 trees per acre, all trees need to be looked at

SURVEY TECHNIQUES

- Methods
  - Flipping branches
  - Inspecting Ground
  - Pole pruners
  - Binoculars
  - GoPro Cameras

SURVEY TECHNIQUES

- At minimum, all trees surveyed need to have a minimum of four branches per tree, covering all four sides of the tree, flipped over and inspected for the presence of HWA ovisacs.

- As time allows:

  - Branches should be inspected at various levels and in the 'inner canopy''.

  - Surveyors should inspect the ground for branches that have broken off trees to check for HWA. This is especially important for trees where the lower limbs are out of reach.

- Hemlocks that are showing signs of stress like browning/graying, loss of needles and a lack of new growth should be noted and inspected thoroughly.

SETTING UP A SITE

- Leaving this up to the local survey unit

- Can address properties as one site or break up into grid system
  - This can help with keeping sites the same from detection surveys through post treatment monitoring

- Small properties can use parcels
  - For subdivisions and areas where properties are less than an acre

WHAT TO DO WHEN YOU FIND A NEW DETECTION

- What do you do if you find a suspect HWA but do not know if it is HWA or not?

WHAT TO DO WHEN YOU FIND A NEW DETECTION

- Record latitude/longitude

- Take pictures with geotagging enabled (if possible, depending on camera type).

- Marking protocol:

  - If the branch is attached to the tree use flagging tape to flag the exact branch containing HWA by tying a strip of tape near the detection.

  - If the branch is not attached to the tree/on the ground, use flagging tape to mark the tree the branch was found under/closest tree to where the branch was found/most likely tree that branch came from. Also, mark with flagging tape and leave where it was found, any portion of a branch that is not submitted as a sample.

- Document where on the tree the HWA was found in the "Notes" section (cardinal directions, height, interior/exterior, etc.)   If the branch was found on the ground, note: "Found on ground"

- Report findings to:

  - Inside the quarantined counties of Allegan, Muskegon, Oceana and Ottawa within townships, cities, villages where HWA has already been confirmed follow these instructions:

    - Drew.Rayner@macd.org

  - Inside or outside the counties of Allegan, Muskegon, Oceana and Ottawa in townships, cities, villages where HWA has not already been confirmed follow these instructions:

    - The detection is not considered a positive until it has been confirmed by MDARD/PPPMD.

    - DO NOT publicly announce a new suspect detection of HWA, rather wait for State of Michigan staff to verify the detection and communicate the detection via the proper channels.

    - Submit sample to PPPMD

WHAT TO DO WHEN YOU FIND A NEW DETECTION

- Sample submission:
  - *NOTE: A compliance agreement needs to be in place to ship samples from the quarantined four-county area.*
  - AT THE LOCATION WHERE THE SAMPLE IS COLLECTED, double bag the sample and seal it by tightly knotting each bag separately. Alternately, use a twist tie or tape to seal each bag. The goal is to make each bag air tight, one within the other.
  - In the package include the following information:
    - latitude/longitude
    - First and last name of person submitting the sample.
    - Email address and phone number of submitter
    - Organization
    - Date of collection
    - Site ID
  - If more than one sample is sent per package it must be clear what sample goes with what information.
  - Only a representative sample needs to be submitted. It is not necessary to ship the entire branch. Whenever possible leave the rest of the infested portion of the tree attached to the tree (or on the ground).

WHAT TO DO WHEN YOU FIND A NEW DETECTION

- Shipping Address:
  - Michigan Department of Agriculture and Rural Development
  - Attn.: Michael Philip
  - 525 W. Allegan
  - Lansing, MI 48933
    - Contact John Bedford by phone or email to inform him that sample is in the way
      - 517-284-5650
      - bedfordj@michigan.gov
      - CC: philipm@michigan.gov
    - PPPMD will communicate results of sample analysis to the submitter as soon as they are available. (Sample from inside the four-counties will be confirmed by PPPMS and those form outside the four-counties will be confirmed by USDA)

DECONTAMINATION

DATA

FOCUSES

- Negative data is as important as positive data

- Data needs to be collected as completed as possible

- Communication is key to make sure we are not duplicating efforts

Hemlock Woolly Adelgid Survey Form

Date:	Name of Observers:		Agency:	County:
Land Use (Circle One):	Private Residense Private Forested Public/Park		Public Forested	**Survey Type:**

Site ID	HWA		EHS		Latitude	Longitude	Hemlock Distribution	DBH	Notes
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					
	Yes	No	Yes	No					

Hemlock Distribution code: NT=No trees; ST=Single tree; FT=Few Trees; CL=Clumped; SC=Scattered; CO=Continuous

DBH Codes: SM=<4", MD=4-12", LC=>12", VS=Various

Any Questions, Contact:
Greg Norwood, NorwoodG@michigan.gov

DATA FIELDS AND DEFINITIONS

Survey				
Date & Time	Date	*Auto Populated*	Date of Survey	YES
Username	Text	*Auto Populated*	ArcGIS Online Credentials	YES
Name of Observer	Text		First and last name of individual conducting survey	YES
Agency	Select_one	Agency List	Name of agency or organization carrying out survey	YES
County	Select_one	County List	County survey talking place in	YES
Land Use	Select_one	Private residence, private forest, public park, or public forest	Circle what land use type best fits the site (Private residence, private forest, public park, or public forest)	YES
Acres	Decimal		Number of acres included in survey	YES
Survey Type	Select_one	Detection or Delimitation	Detection or delimitation	YES
Site ID	Text		Enter unique site name (address, park name, parcel ID #, compartment & stand, or other unique identifier)	YES
Comments	Text		Include things like details on the site, information requested below for what to do if a positive detection is found, and any information that is unique to the site	NO

Field	Type	Options	Description	Required
Comments	Text		Unique to the site	NO
Unique ID	Text		If "Survey Type" = Delimitation, Unique identifier for breaking up sites into easier to reference areas	NO
Tree Tag Number	Integer		If "Survey Type" = Delimitation, Number of tree tag(s) referrenced	YES
HWA Present	Select_one	Yes, No, Not Detected: Proxy Skip, Not Detected: Out of Reach, Yes, No, Pending Verification	If "Survey Type" = Detection then options are Yes, No, Pending Verification. If "Survey Type" = Delimitation then options are Yes, No, Not Detected: Proxy Skip, Not Detected: Out of Reach. Is HWA present at the site: Yes means crawlers or ovisacs are detected at time of the survey, No means no crawlers or ovisacs are detected at the time of survey, maybe means detection can not be confirmed and a confirmation is needed, the Other means trees were not able to be surveyed	YES
EHS Present	Select_one	Yes, No, Not Detected: Proxy Skip, Not Detected: Out of Reach, Yes, No, Pending Verification	If "Survey Type" = Detection then options are Yes, No, Pending Verification. If "Survey Type" = Delimitation then options are Yes, No, Not Detected: Proxy Skip, Not Detected: Out of Reach. Is EHS present at the site: Yes means EHS is detected at time of the survey, No means EHS is not detected at the time of survey, maybe means detection can not be confirmed and a confirmation is needed, and Other means trees were not able to be surveyed	YES
Visible Quadrant	Select_multiple	N, S, E, W	If "HWA Present/EHS Present" = yes, Quadrant of tree where ovasacs are visible	YES
Latitude	Geo_point	*Auto Populated*	Decimal degree latitude, minimum or 4 decimal places but 6 is preferred	YES
Longitude	Geo_point	*Auto Populated*	Decimal degree longitude, minimum or 4 decimal places but 6 is preferred	YES
Hemlock Distribution	Select_one	NT, ST, FT, CL, SC, CO	If "Survey Type" = Detection, Use a two-digit code (described at the bottom of the data sheet) to label the stand (NT-no trees, ST-single tree, FT-few trees, CL-clumped, SC-scattered, and CO-continuous)	YES
Record Area	Select_one	0, 1, 2, 3, 4, 5	If "Survey Type" = Detection, 0=None, 1=Individual/few, 2= <1,000 sq.ft (half tennis court), 3=1,000 sq.ft. to 0.5 acre, 4=0.5 acre to 1 acre (football field), 5= >1 acre	YES
Number of Trees	Integer		If "Survey Type" = Detection, Number of trees being referenced	YES
DBH Class	Select_one	SM, MD, LG, VA	If "Survey Type" = Detection, Tree diameter code: SM= <4" MD= 4-12" LG= >12" VA= various	YES
DBH Size	Decimal		If "Survey Type" = Delimitation, Exact number of inches at diameter at breast height for use of treatments	YES
Sample Collected?	Select_one	Yes or No	Was a sample taken from a suspected HWA positive hemlock?	YES
Comments	Text		Include information unique to this tree or set of trees, location of tree(s), or any other information unique to the specific instance	NO
Picture	Image		Photo for HWA confirmation	NO

DATA FIELDS AND DEFINITIONS

Treatment		*Each treatment should represent 1 acre (1pt/acre)		
Treatment Date	Date		Date of treatment	YES
Username	Text	*Auto Populated*	ArcGIS Online Credentials	YES
Submitted By	Text		Organization/company doing treatment	YES
Grant	Text		Funding source that covered treatment	YES
Property Owner	Text		Name of property owner	YES
Unique ID	Text		Type in Unique ID from original survey	NO
Site ID	Text	Default of site ID from original survey	Enter site ID from previous survey	YES
Address	Text		Address of treatment	NO
County	Select_one	County List	County of treatments	YES
Latitude	Geo_point	*Auto Populated*	Decimal degree latitude, minimum or 4 decimal places but 6 is preferred	YES
Longitude	Geo_point	*Auto Populated*	Decimal degree longitude, minimum or 4 decimal places but 6 is preferred	YES

Tree Tags Treated	Text		List all tree tag numbers of all trees treated	YES
Total DBH Treated	Decimal		Total number of DBH inches treated	YES
All Trees Treated?	Select_one	Yes or No	Were all trees on property treated?	YES
Method	Select_one	Injection, Basal Bark, Soil Drench	Method of treatment carried out	YES
Chemical Name	Select_one	Dino, Imd, Both	Which chemical was used for treatment? If both, be sure to add information for the second chemical	YES
Chemicals Mixed	Select_one	Yes or No	If "Chemical Name" = Both, Were chemicals mixed for treatment?	YES
Chemical Brand Name	Text		Brand name of the insecticide used for treatment	YES
2nd Chemical Brand Name	Text		If "Chemical Name" = Both, 2nd Brand name of the insecticide used for treatment	YES
EPA Reg #	Integer		EPA Reg # of the product being used	YES
2nd EPA Reg #			If "Chemical Name" = Both, 2nd EPA Reg # of the products	YES
Concentration of Chemical	Double		Concentration of chemical on product label (%)	YES
2nd Concentration	Double		If "Chemical Name" = Both, 2nd Concentration of chemical on product label (%)	YES
Chemical Mix Rate	Text		Amount of chemical mixed in the carrier (Ounces per gallon)	YES
2nd Chemical Mix Rate	Text		If "Chemicals Mixed" = No, 2nd Amount of chemical mixed in the carrier (Ounces per gallon)	YES
Carrier	Select_one	Water, MSO	List product that chemical was mixed in	YES
2nd Carrier	Select_one	Water, MSO	If "Chemicals Mixed" = No, List product that chemical was mixed in	YES
Amount of End Use Dilution Applied	Integer		Amount of product applied in end up mix of chemical and carrier that is applied during treatment	YES
2nd Amount of End Use Dilution Applied	Integer		If "Chemicals Mixed" = No, Amount of 2nd product applied in end up mix of chemical and carrier that is applied diuring treatment	YES
Rate of application	Text		Rate of application of end use dilution per DBH (Ounces per DBH)	YES
2nd Rate of application	Text		If "Chemicals Mixed" = No, 2nd Rate of application of end use dilution per DBH (Ounces per DBH)	YES
Comments	Text		Treatment comments about the tree(s)	NO

DATA FIELDS AND DEFINITIONS

Monitor				
Date/Time	Date	*Auto Populated*	Date of monitor	YES
Username	Text	*Auto Populated*	ArcGIS Online Credentials	YES
Name of Observer	Text		First and last name of individual conducting monitor	YES
Agency	Select_one	Agency List	Name of agency or organization carrying out surveys	YES
Unique ID	Text		Enter unique ID from previous survey	NO
Site ID	Text	Default of site ID from original survey	Enter site ID from previous survey	YES
Date of Last Treatment	Date	Default of last treatment date	Date of last treatment	YES
Chemical Used	Select_one	Dino, Imd, both	Which chemical was used for treatment? If both, be sure to add information for the second chemical	YES
HWA Detected	Select_one	Yes or No	Are ovasacs present?	YES
EHS Detected	Select_one	Yes or No	Are ovasacs present?	YES
Tree Tag #	Text		List tree tag numbers for trees being referenced	YES
Comments	Text		Monitoring comments	NO

SURVEY 1,2,3 APPLICATION