



Operating Under a Citrus Canker & HLB Paradigm

Nate Jameson - Brite Leaf Citrus Nursery
March 5th, 2024



Presentation Focus

Nineteen of years history in 30 minutes

Citrus Canker

How did we get CC ?

What we did right.

What we did wrong.

How it changed our industry?

ACP & HLB

How did we get HLB?

What we did right.

What we did wrong.

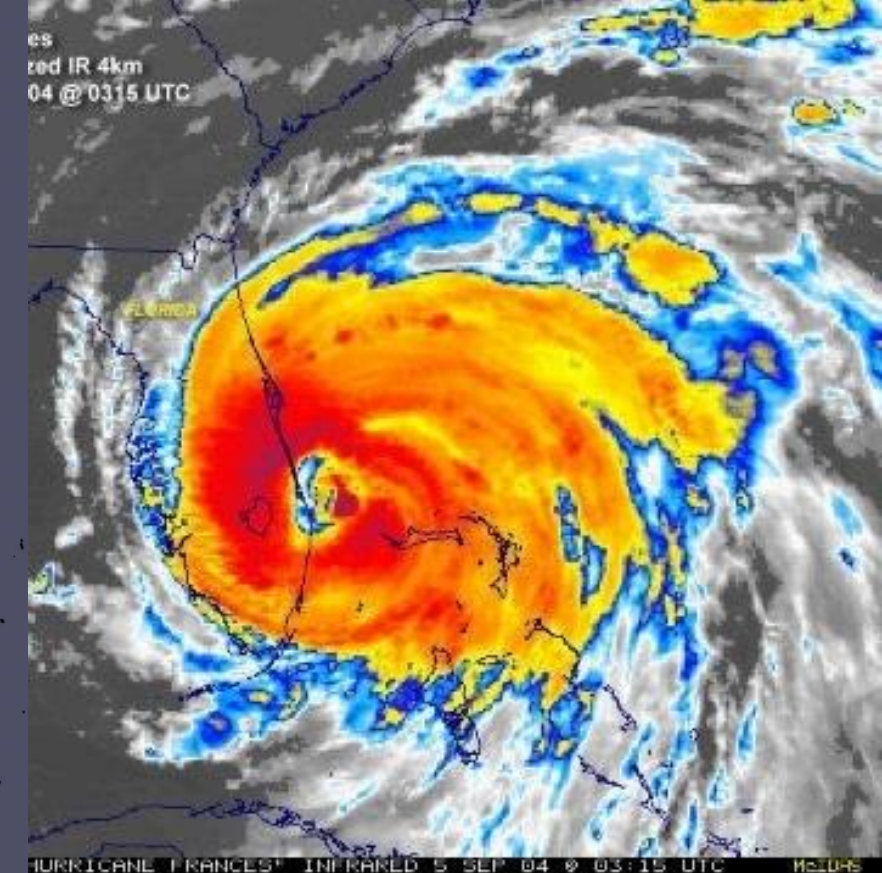
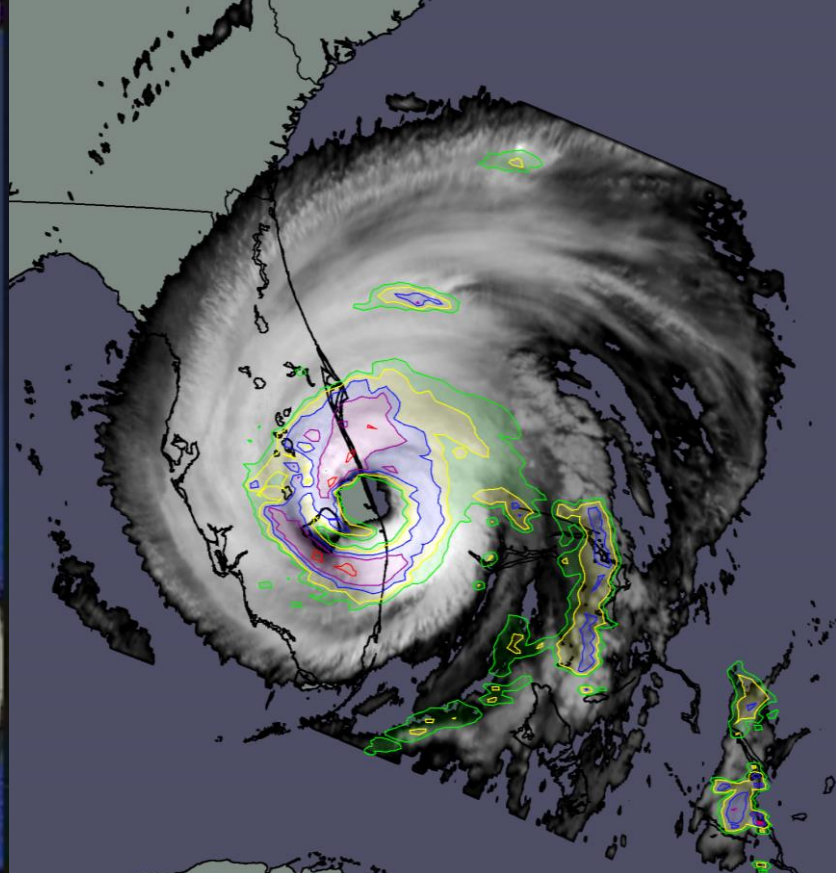
How it changed our industry?



Citrus Canker History in Florida

- Canker was first introduced in Florida around 1912 from imported seedlings from Japan and declared eradicated in 1933
- Second discovery in Florida in Manatee County (1986) and thought to be eradicated in 1994
- Third introduction in Florida in urban Miami in 1995
- Canker spread from Miami in 1995 to twenty-five counties throughout central and south Florida
- A statewide mandatory eradication with the 1900 foot (579 m) rule was implemented in 2000 after determining the original 125 foot (38.1 m) rule was not effective
- By March 2002, over 1.56 million commercial trees and almost 600,000 infected and exposed dooryard trees were removed
- Tree removal of infected and exposed trees was delayed due to lawsuits in 2002 by homeowners in Broward county
- The state of Florida is under quarantine and the movement of citrus fruit is prohibited to any citrus producing region





2004 Hurricanes

Charlie Aug. 13th, Frances Aug. 24th & Jeanne Sept. 13th



Citrus Canker Settlement \$76,871,320

With Hindsight-
Homeowner CC
eradication was a mistake

Miami-Dade County Citrus Canker Eradication Program

Home Commonly Asked Questions Contact Page Documents Check Reissue Requests Small Estate Declaration

If You Owned Residential Citrus Trees in Miami-Dade County that were Destroyed Between 2000-2006 Under the Citrus Canker Eradication Program

You Could Get Money From a Settlement

Initial Payments to eligible Class Members mailed on November 17, 2022. These checks are valid for 1-Year, please cash them as soon as possible.

- * The Motion for Final Approval of Class Settlement and Application for Attorneys' Fees, Costs and Expenses, and Class Representative Service Awards was granted on March 28, 2022. Please click [HERE](#) to view.
- * A Settlement was reached in the class action lawsuit seeking full compensation for the owners of approximately 247,972 citrus trees in Miami-Dade County, that were not determined to be infected with citrus canker and were destroyed by the Florida Department of Agriculture ("the Department"), on or after January 1, 2000, under the Citrus Canker Eradication Program ("CCEP"). The lawsuit sought full compensation based on the replacement cost of the destroyed trees.
- * You are included in the Settlement and qualify for a payment if you owned residential citrus trees located within Miami-Dade County, incorporated or otherwise, that were (i) not used for commercial purposes, (ii) not determined by the Department to be infected with citrus canker, and (iii) destroyed under the CCEP on or after January 1, 2000.
- * Under the Settlement, a Settlement Fund of \$76,871,320 has been created to pay (1) eligible Class Members, (2) the costs of notice and administration, (3) attorneys' fees, costs and expert fees to Class Counsel, and (4) service awards to the five Class Representatives.
- * On March 28, 2022, the Court in charge of this lawsuit granted Final Approval to the Settlement.

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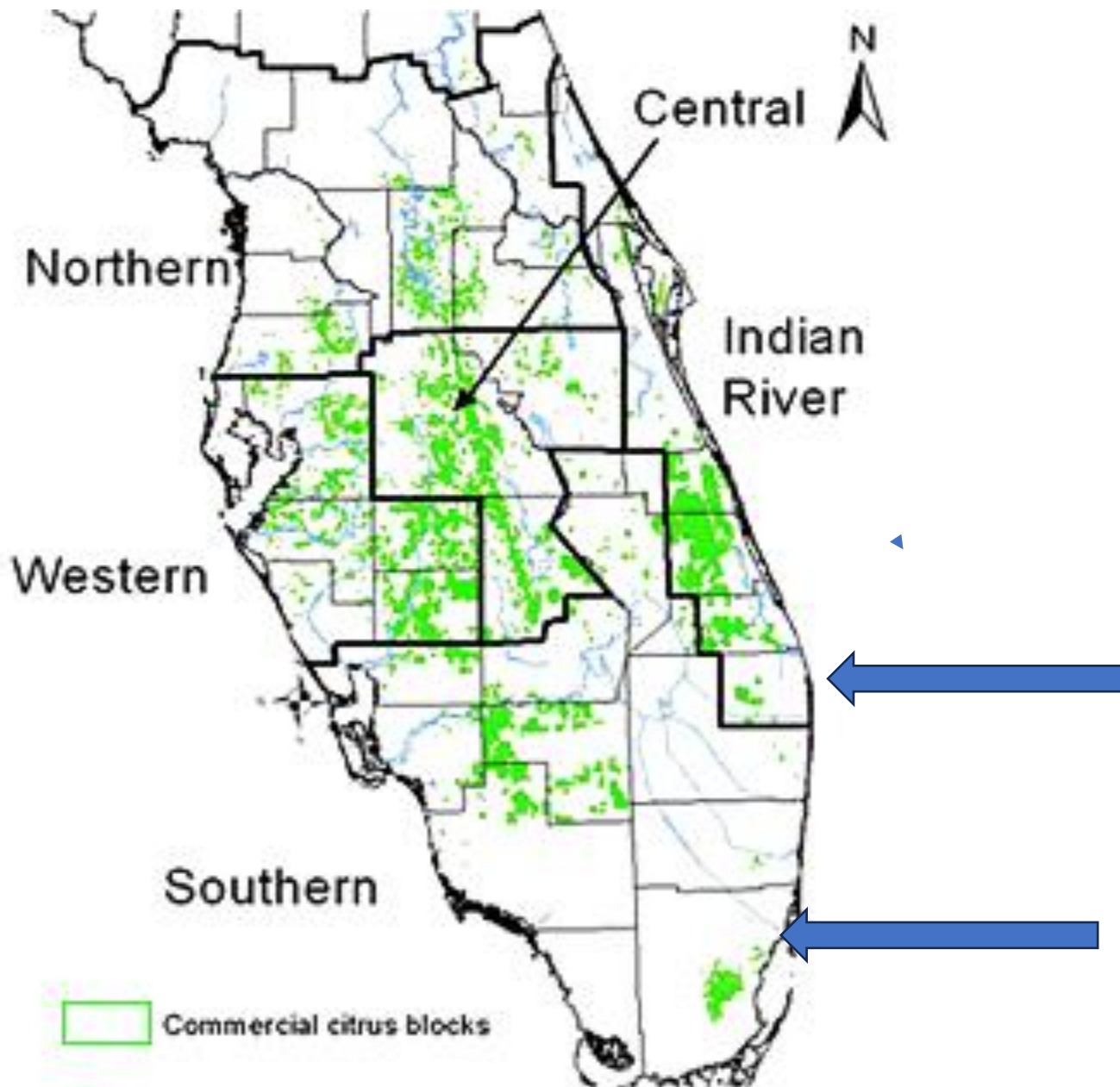
Adobe Reader is free and is required to view and print documents on this site. Please do not contact the Court with regarding Citrus Canker Compensation. This site is administered by an administrator firm that handles all aspects of the Citrus Canker Compensation.

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How Did ACP Get into FL?

- The Asian citrus psyllid (ACP), *Diaphorina citri* Kuwayama, was first detected in Florida by Dr. Susan Halbert on June 2, 1998. At that time, the distribution was along Highway 1 on the east coast of Florida from Broward to St. Lucie counties and was thought to be limited to dooryard host plantings.



Psyllids Found June 1998 ²

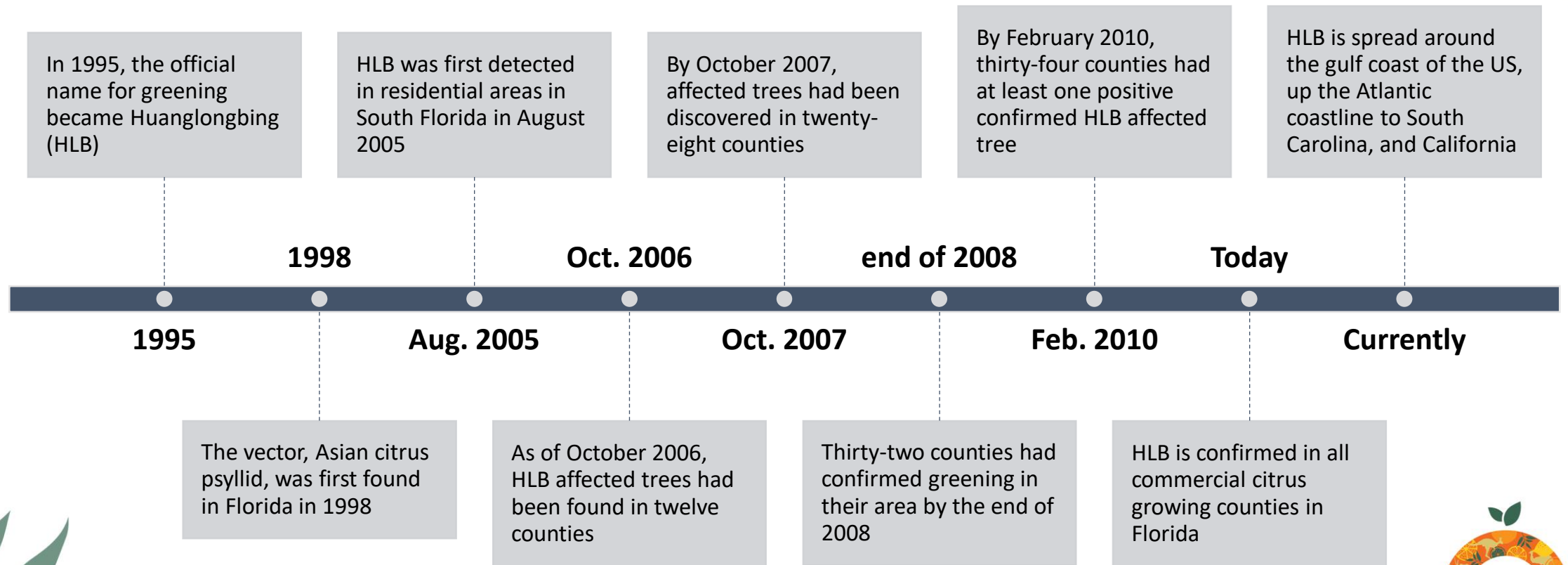
https://ipm.ifas.ufl.edu/agricultural_ipm/asian.shtml

HLB Found in 2005 ¹

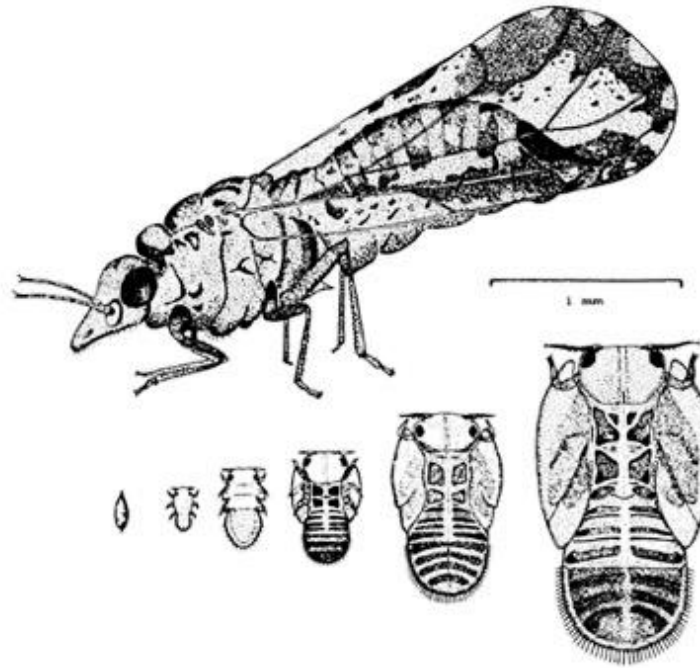
<https://crec.ifas.ufl.edu/research/citrus-production/disease-identification/citrus-greening-huanglongbing/>



HLB, A FLORIDA HISTORY



Host + Vector + Disease = HLB



ACP & HLB GENERAL RULES

- Numerous generations per year
- Egg to adult in 2 weeks at 75°F to 85°F (24 to 29.5°C)
- Duration of the nymphal stages is about 12 to 14 days at 82°F (27.8 °C)
- Adult psyllids may live for several months in cool temperatures
- Psyllids acquire the bacterium from infected trees. They do not hatch infected.
- 2/3 of ACP are found in the top 1/3 of the tree in new flush
- Can be 3 years between tree infection and disease detection

Current Status of ACP in USA

- Asian Citrus Psyllid (ACP) was first found in the US in Florida in 1998.
- In 2001, ACP was found in Texas.
- In 2008, it was detected throughout the Southeastern United States including Georgia, Mississippi, Alabama, Louisiana, and South Carolina.
- In 2008 in California.
- In 2009, it was found in Arizona.
- Currently, all citrus-producing states and territories have ACP.

• <https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/citrus/acp>

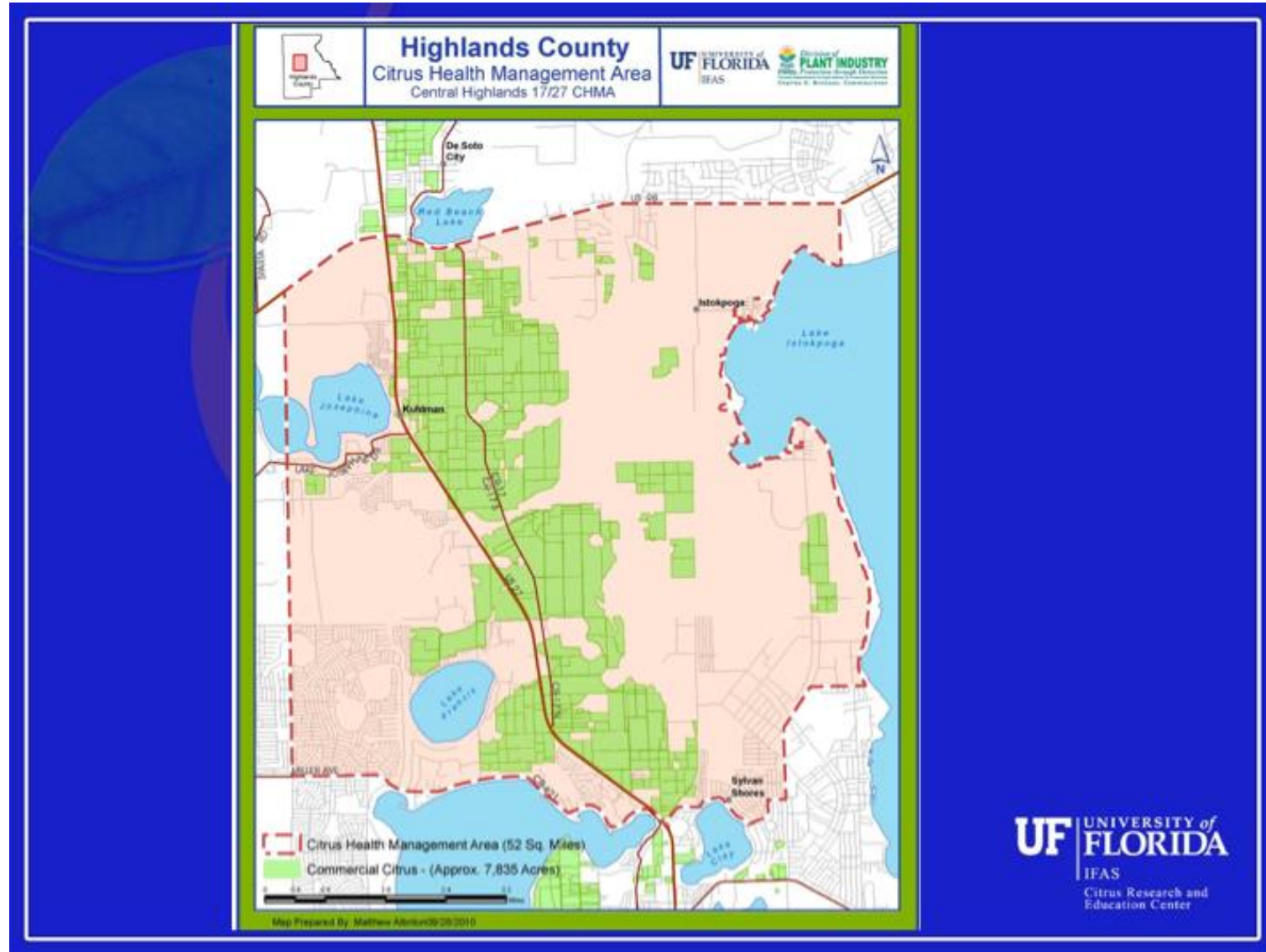


What have we done to fight ACP & HLB?

- All budwood production had to be tested and fully protected to ensure HLB was not present in the budwood supply.
- All citrus nursery production moved to fully enclosed production systems.
- All citrus nurseries were required by state law to be fully enclosed by January 1, 2007.
- Routine inspection and testing for all citrus nurseries was implemented.



Citrus Health Management Areas



Citrus Health Management Areas (CHMA's): Guide to developing a psyllid management plan

Michael E. Rogers, Philip A. Stansly and Lukasz L. Stelinski

Table 1: Planning template for CHMAs where most fruit harvesting expected in the months of Jan, Feb, Mar, May or June

Month	Timing	Product ³	Comments
November / December	After last flush of the season	Organophosphate ¹	*Optimal time for coordinated spray* ; first dormant spray; serves as a clean up spray to eliminate adult ACP going into the overwintering period.
January / February	Prior to first flush of season	Pyrethroid ²	*Optimal time for coordinated spray* ; second dormant spray; prior to first flush in spring control ACP that overwintered as adults or reproduced on unexpected winter flushes.
March (bloom period)	Depending on pest pressure	several options	Do not use pyrethroid since previously used. Do not use an organophosphate which is planned for the next application. Products that can be sprayed during bloom include Micromite and Portal but should only be applied when new flush is present since these products only control psyllid nymphs (not adults).
April	Immediately post bloom	Organophosphate ¹	*Possible time for coordinated spray using an OP* ; this time is the first opportunity to control adult psyllids that developed on flush associated with bloom when most insecticides cannot be applied due to label restrictions preventing application during bloom. Growers in CHMAs not participating in a coordinated spray at this time may choose to use a product with a different mode of action.
May	Depending on pest pressure	Various options	Could use a pyrethroid since not previously used. Other options include Movento, Delegate (if leafminer present) or carbaryl.
June	1 st summer oil spray	Various options	Depending on the product used in the previous spray, numerous products (see Table 2) could be added to the summer oil sprays as well as tank mixed with other products depending on the life stages of psyllid controlled by each product and other pests requiring control such as leafminer or rust mites. During this time it may be difficult to coordinate sprays with the same mode of action, but coordination of the timing of summer oil sprays by growers within a CHMA could still be a feasible goal.
July	2 nd summer oil spray	Various options	
August / September	Prior to fall flush	Pyrethroid ²	*Possible time for coordinated spray using a pyrethroid* ; Control psyllids that may have developed on sporadic summer flushes prior to the fall flush period when psyllid populations can rapidly increase. Growers in CHMAs not participating in a coordinated spray at this time may choose to use a product with a different mode of action.
October	Depending on pest pressure	Various options	Do not use pyrethroid since previously used. Do not use an organophosphate which is planned for next application. Options include Movento, Delegate, and carbaryl.

¹ Organophosphate insecticides that can be used for psyllid control include Dimethoate, Imidan, Lorsban, Malathion and various generic formulations of these products.

² Pyrethroid insecticides currently registered for use in Florida citrus include Danitol and Mustang.

³ Refer to Table 2 for information on product rates, application methods, psyllid life stages controlled and effective application methods.

Central Highlands 17/27 CHMA: 2010-11 Coordinated Psyllid Spray Plan

Month	Application Window Targeted ¹	Chemical Class ²	Comments
November / December	Nov 8-19	Organophosphate	<u>Possible OP product options:</u> chlorpyrifos (Lorsban), dimethoate, malathion, phosmet (Imidan)
January / February	Jan 31-Feb 14	Pyrethroid	<u>Pyrethroid product options:</u> fenpropathrin (Danitol), zeta-cypermethrin (Mustang)
March (bloom period)			
April	Immediately post bloom (DATES TBA)	Organophosphate	<u>Possible OP product options:</u> chlorpyrifos (Lorsban), dimethoate, malathion, phosmet (Imidan)
May	Depending on pest pressure	Various options	Growers are encouraged to add psyllid control products to their planned summer oil or nutritional spray programs. Make sure to not apply the same chemical class back-to-back keeping in mind the products planned to be used during the coordinated sprays in April and August/September windows.
June	1 st summer oil spray	Various options	
July	2 nd summer oil spray	Various options	
August / September	Prior to fall flush (DATES TBA)	Pyrethroid	<u>Pyrethroid product options:</u> fenpropathrin (Danitol), zeta-cypermethrin (Mustang)
October	Depending on pest pressure	Various options	Do not use pyrethroid since previously used. Do not use an organophosphate which is planned for next coordinated spray in Nov.

¹ Four Coordinated sprays planned for 2010-2011 are highlighted in yellow. All growers in the Central Highlands 17/27 CHMA are encouraged to treat their groves in this 2 week window.

² In order to prevent pesticide resistance, growers are encouraged to use a product from the specified chemical class.



Individual Protective Covers (IPC's)

- Placed on the tree until bag is full, then removed.



Citrus Under Protective Screen (CUPS)



Trunk Injections



Trees Planted

Year	Totals
2012-2013	3,944,049
2013-2014	4,700,728
2014-2015	4,712,439
2015-2016	4,438,128
2016-2017	4,344,446
2017-2018	3,572,797
2018-2019	3,971,662
2019-2020	3,933,815
2020-2021	4,825,343
2021-2022	3,572,190
	<hr/>
	42,015,597

Source-FDACS



Estimated Acres Planted

Spacing (ft)	Tree/Ac	Estimated Acres Planted
10 X 25	174	241,469
10 X 20	217	193,620
10 X 18	242	173,618
Average		202,902 ac or (82,112 ha)



Economic Impact of HLB

All Citrus	2007-08 Season	2021-22 Season	Decrease	Percent Decrease
Production Boxes (millions)	203.8	45.1	(158.7)	-78%
Bearing Acres	576,577	375,302	(201,275)	-35%
Annual On-tree Value (billion)	\$1.3	\$0.44	(\$0.86)	-66%
Processing Plants	25	5	(20)	-80%
Fresh Fruit Packinghouses	45	15	(30)	-67%
Florida Citrus Growers	8,000	2,500	(5,500)	-69%

Source-Florida Citrus Mutual



Impact of HLB on Florida Citrus: A Significant Production Loss

SEASON	BOXES	BEARING ACRES
2003-04	291,800,000	748,555
2005-06	174,600,000	621,373
2007-08	203,800,000	576,577
2009-10	159,350,000	554,037
2011-12	170,990,000	531,493
2013-14	124,130,000	515,147
2015-16	94,305,000	480,121
2017-18	49,680,000	447,012
2019-20	73,270,000	419,452
2021-22	45,130,000	375,302

Source-Florida Citrus Mutual



Dollars Invested

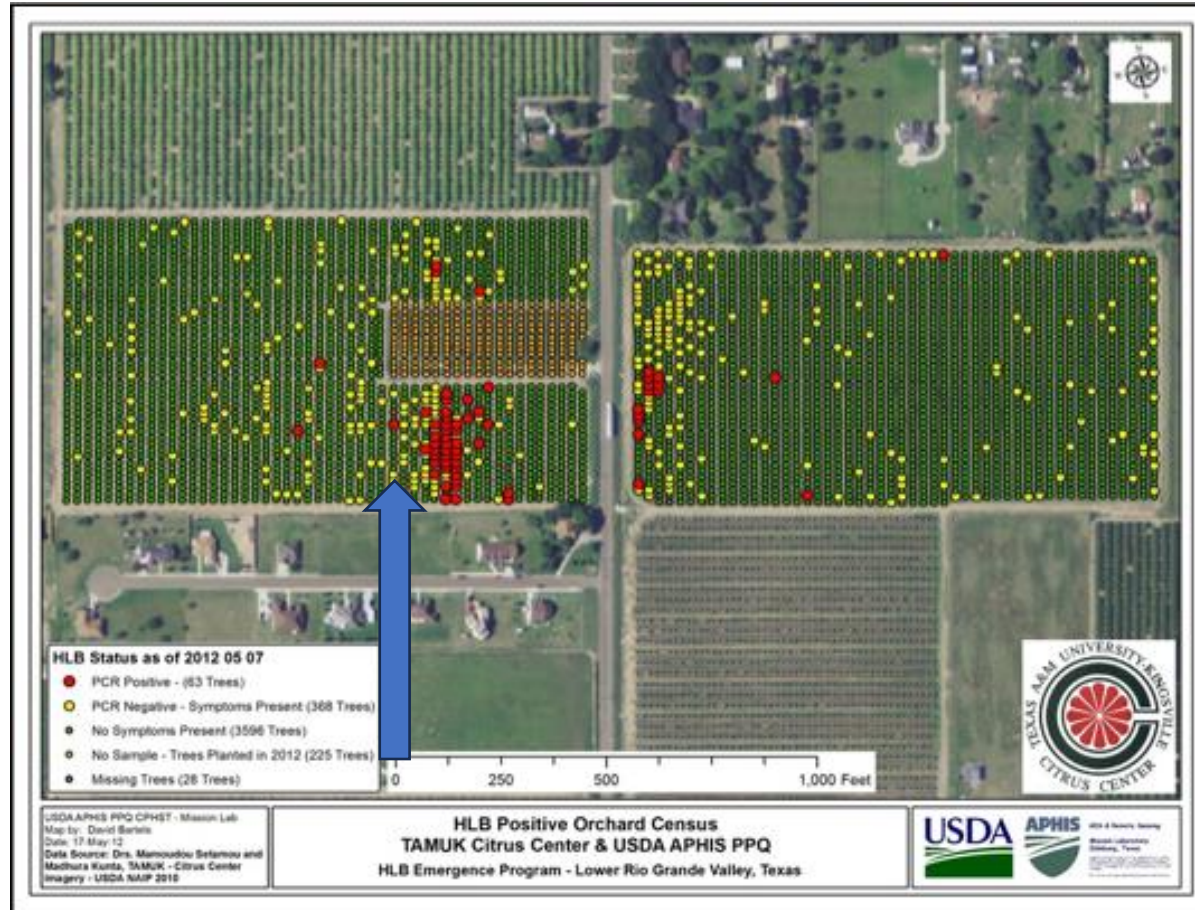


Over A Billion Dollars and Increasing!

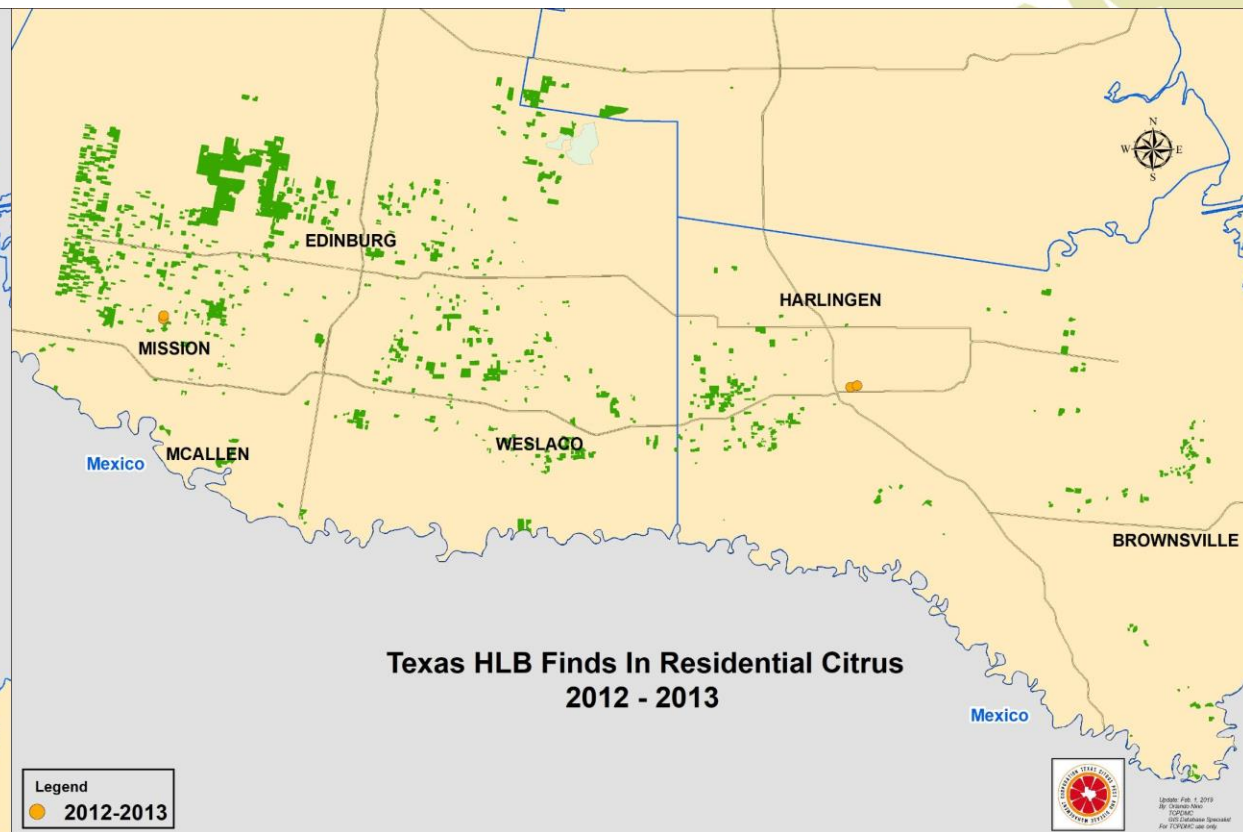
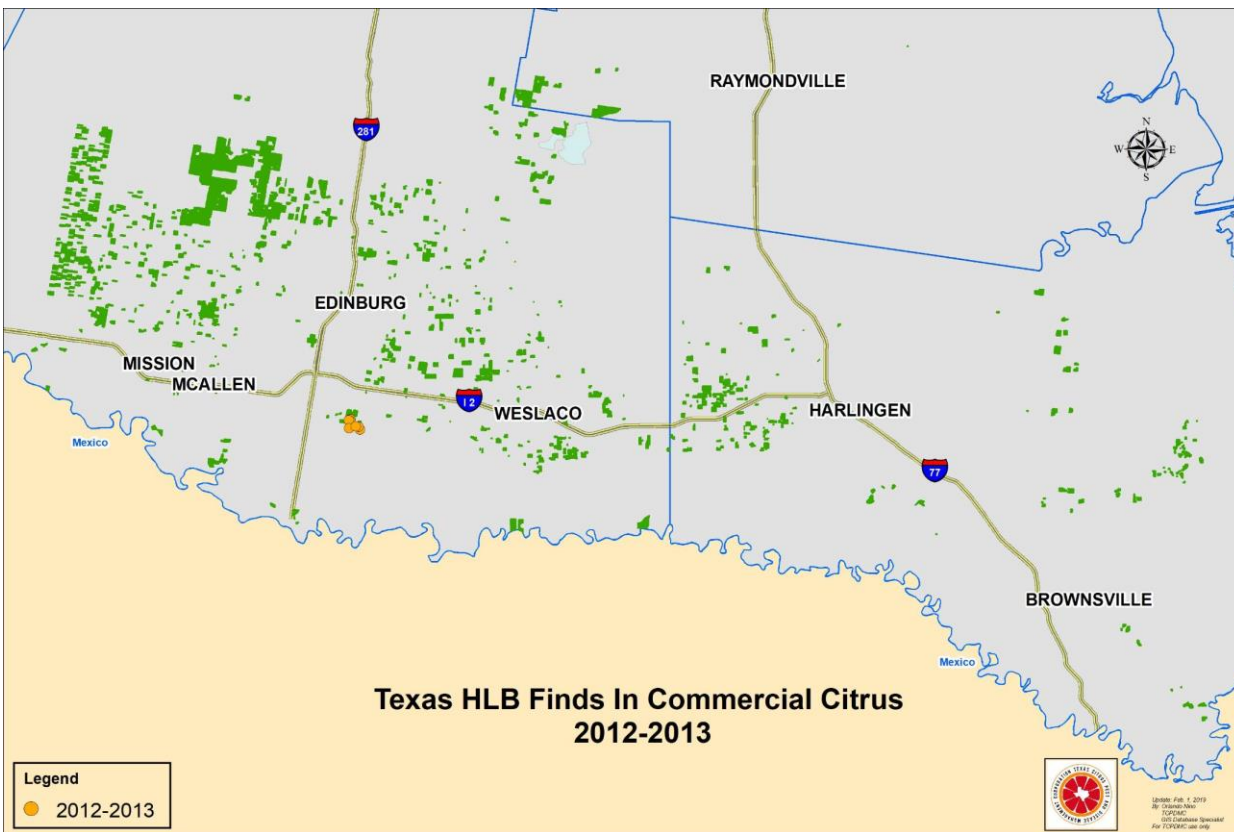
Texas Citrus Industry Review

First Texas HLB Find Friday the 13th of January 2012
The 1st tree in the 13th row of a Texas citrus orchard was confirmed positive.

https://www.tamuk.edu/agriculture/files/AG/citr/Newsletters/June_2012_Vol_30_No_1.pdf

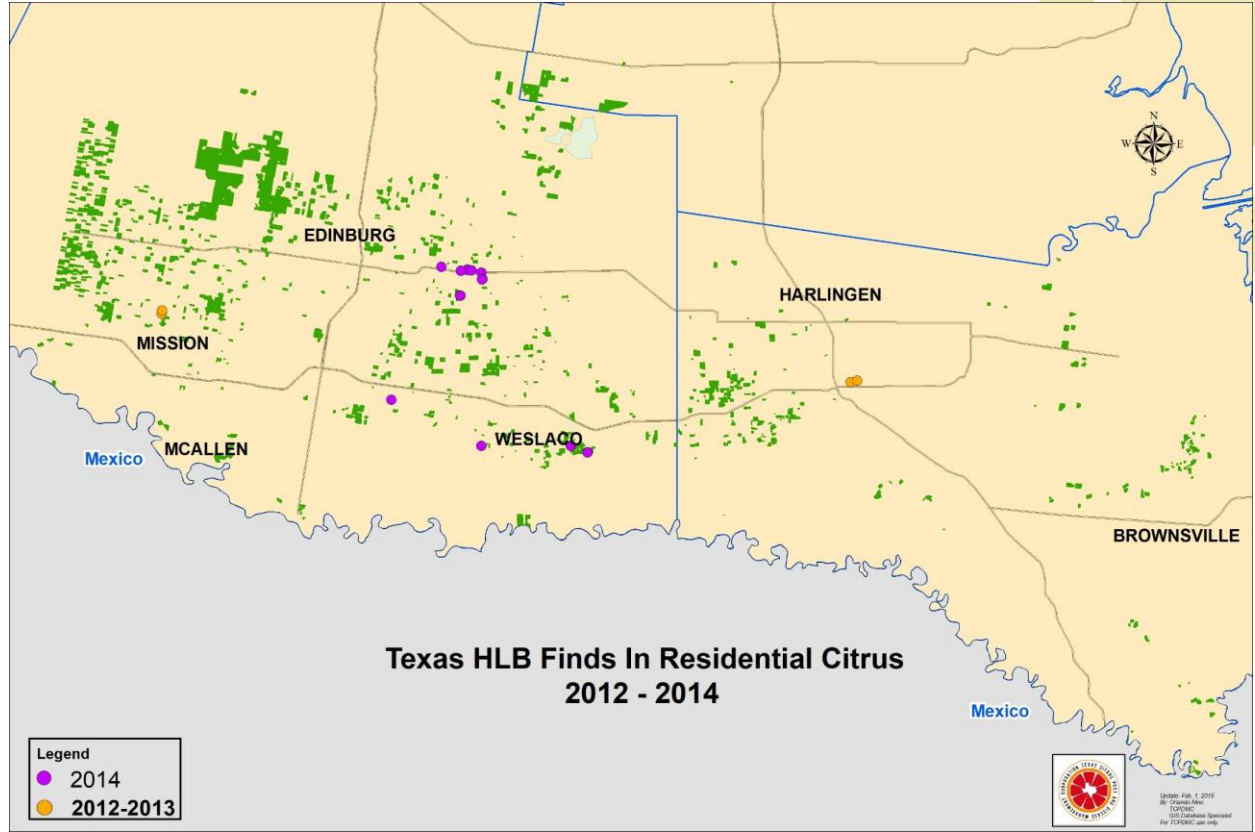
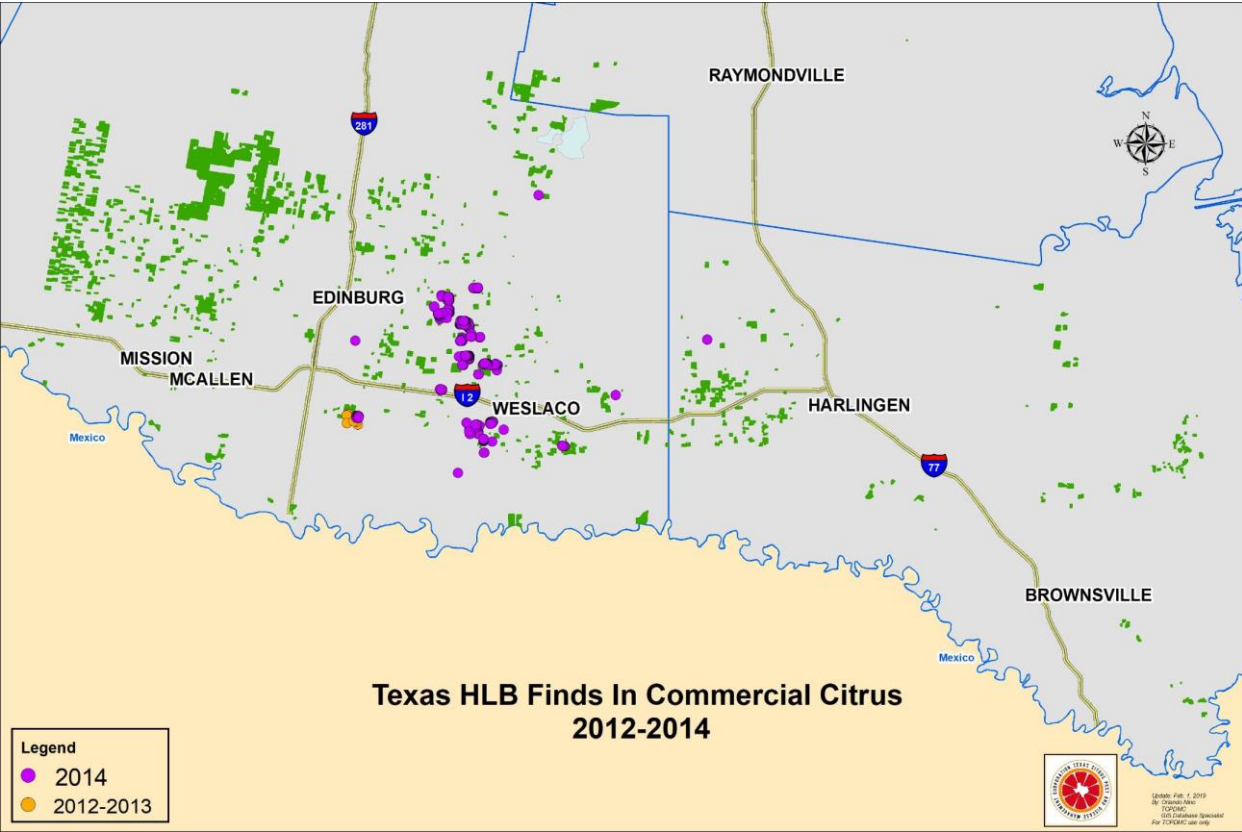


2012 - 2013

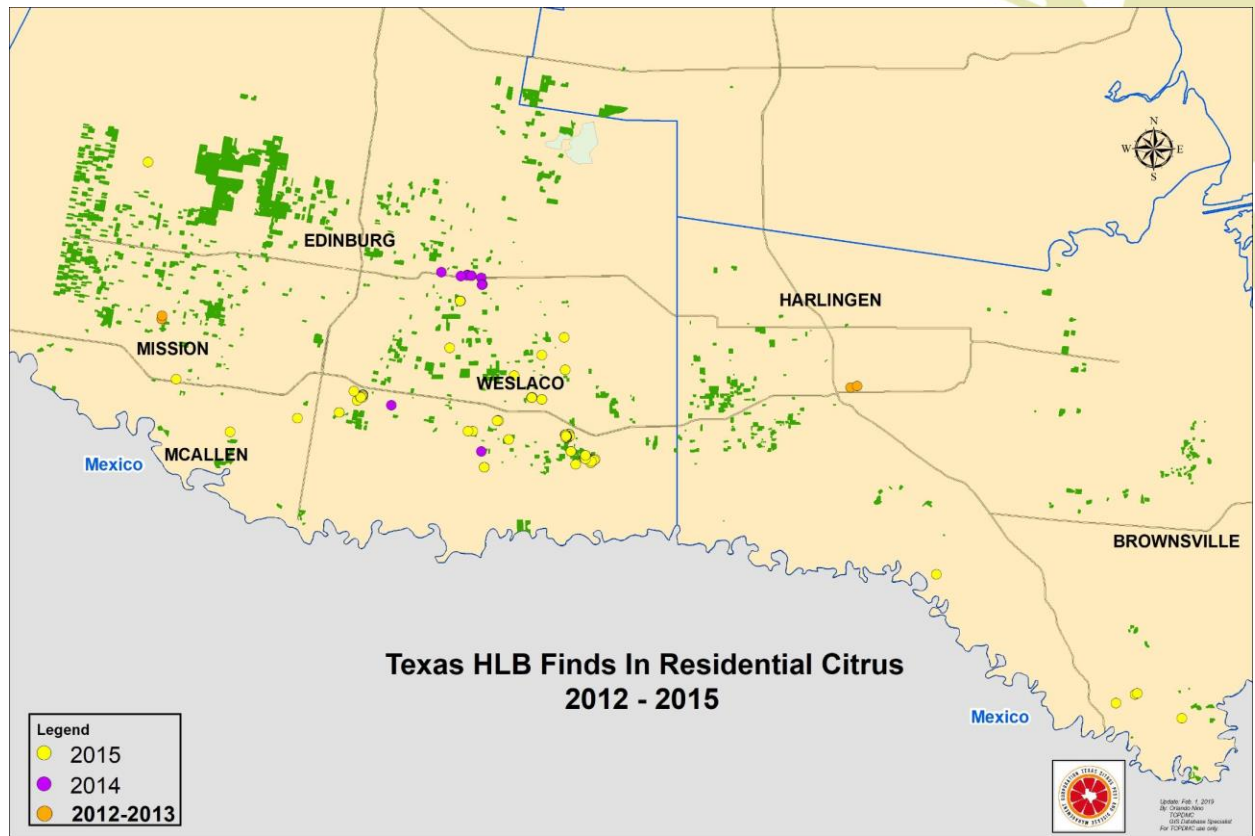
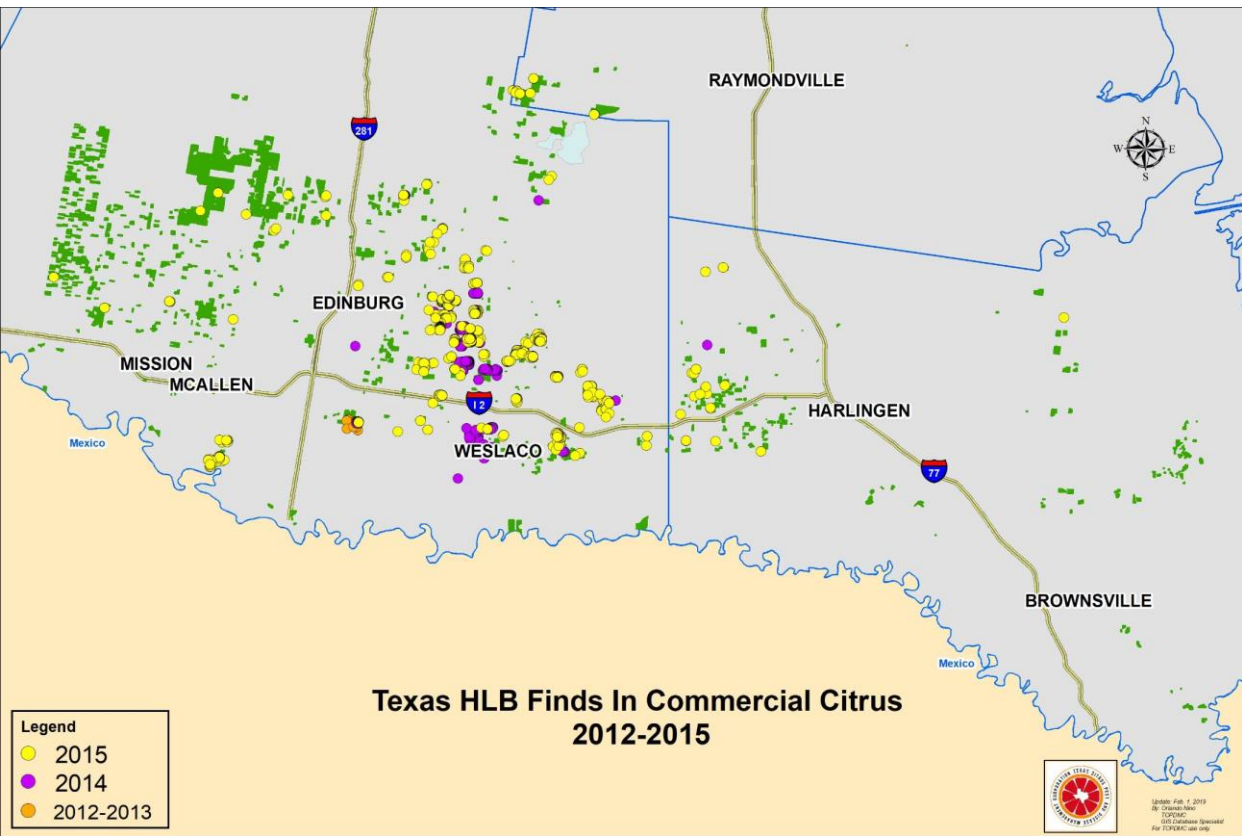


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2012 - 2014

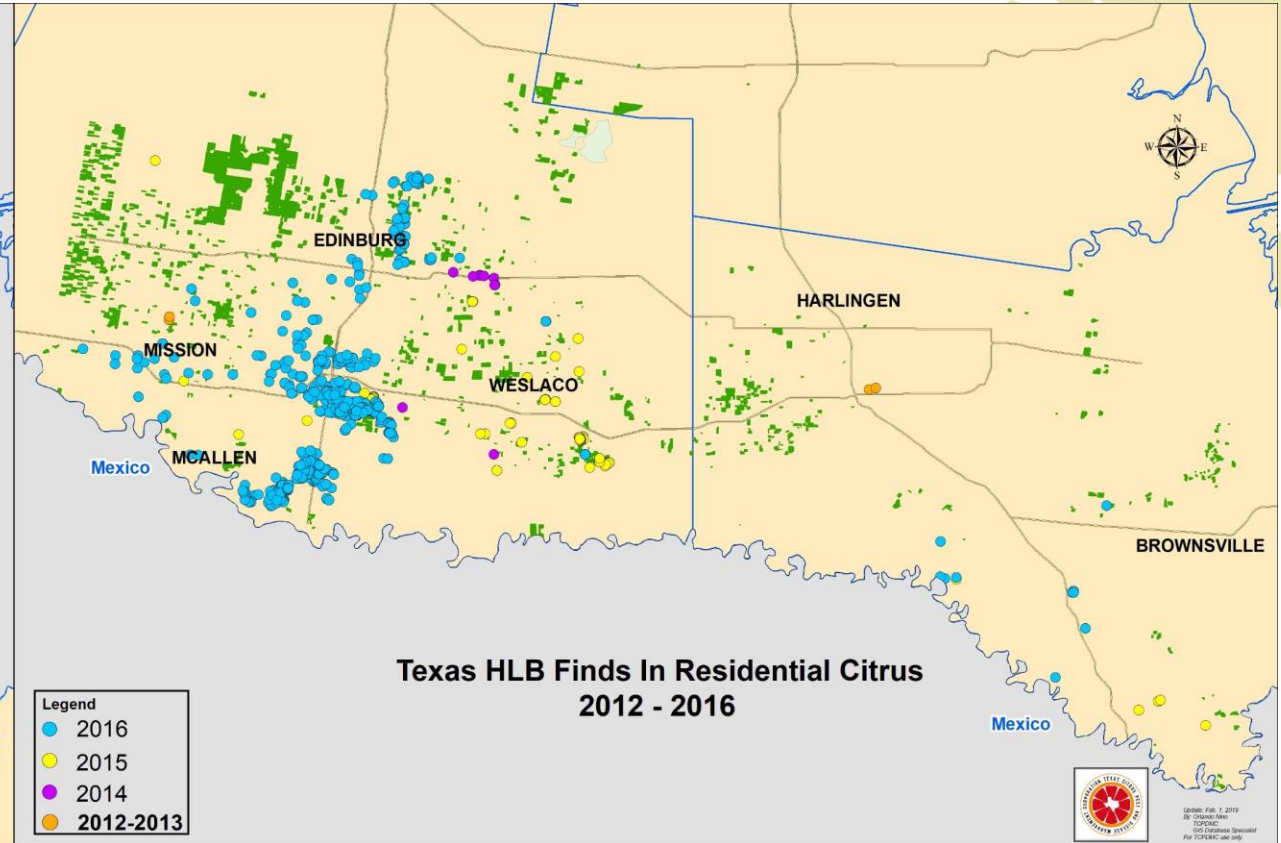
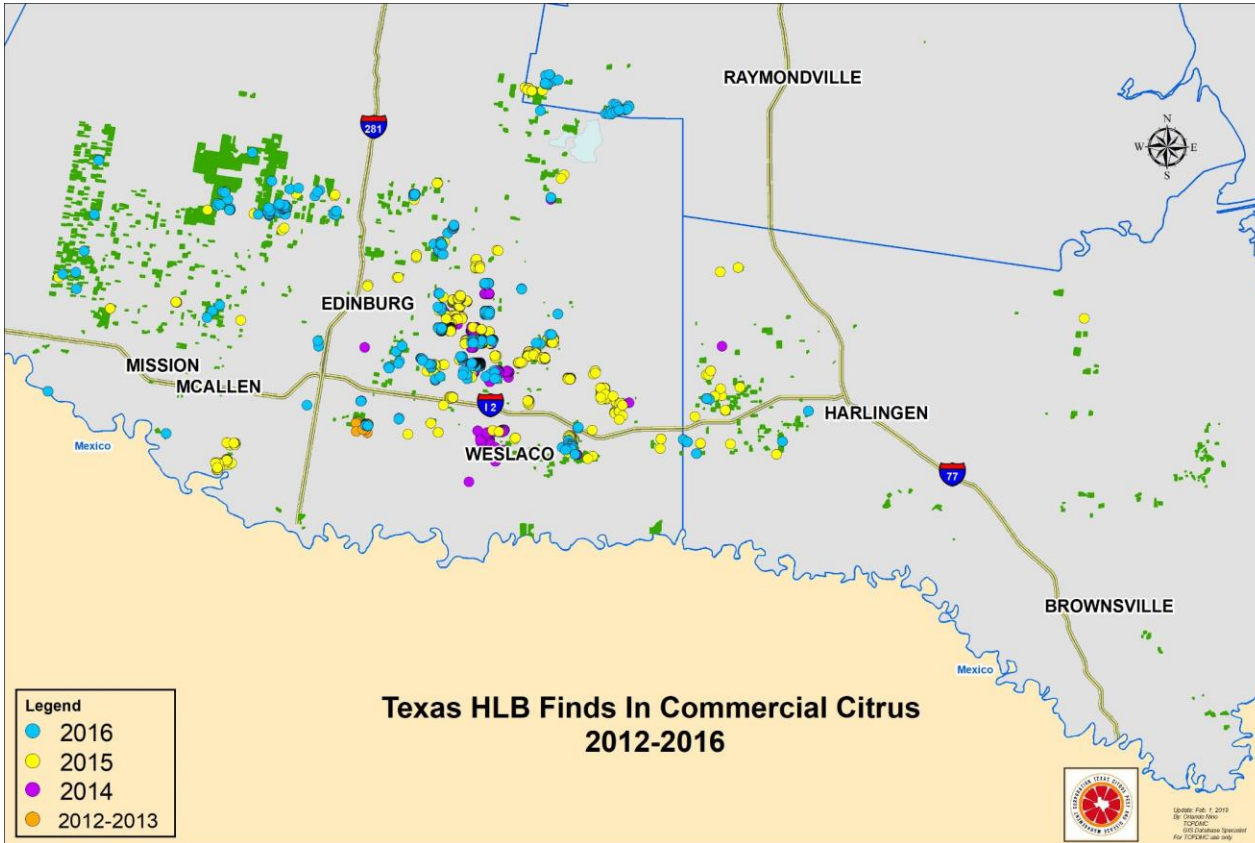


2012 - 2015

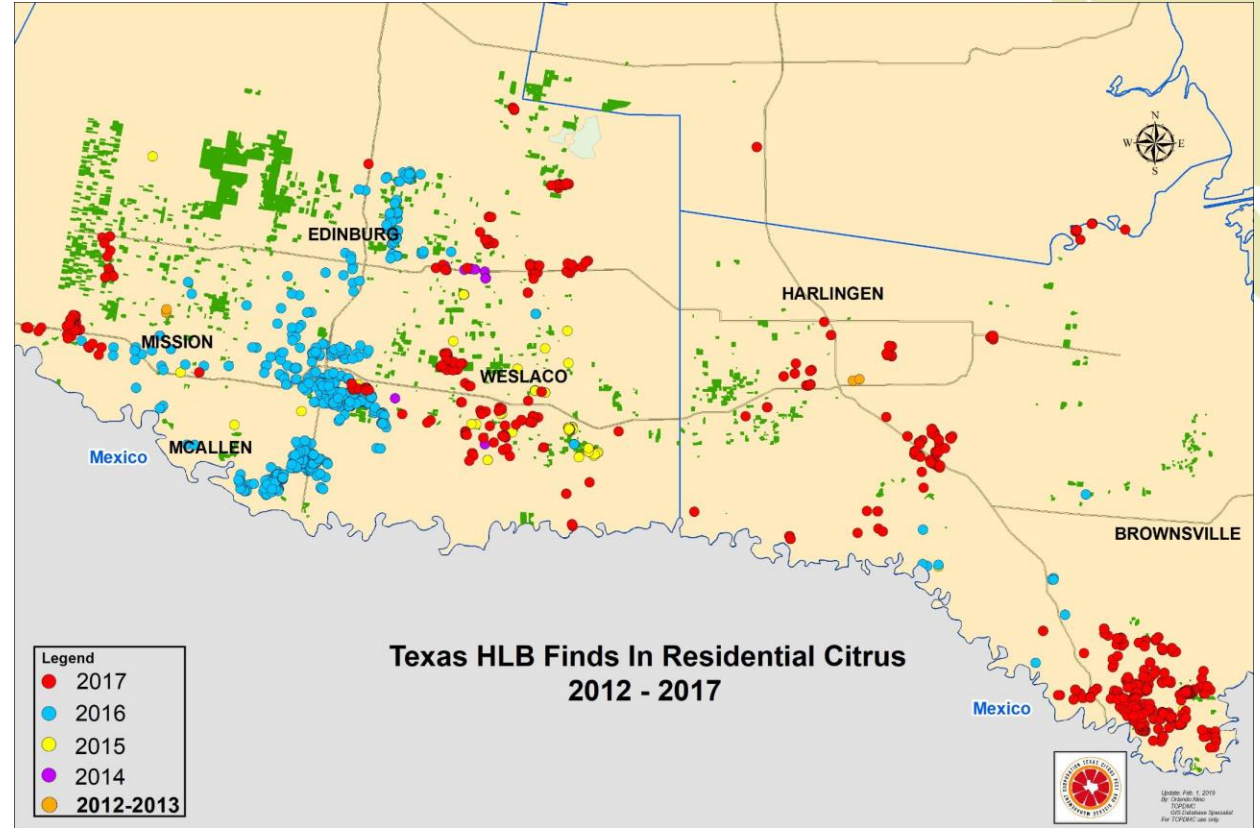
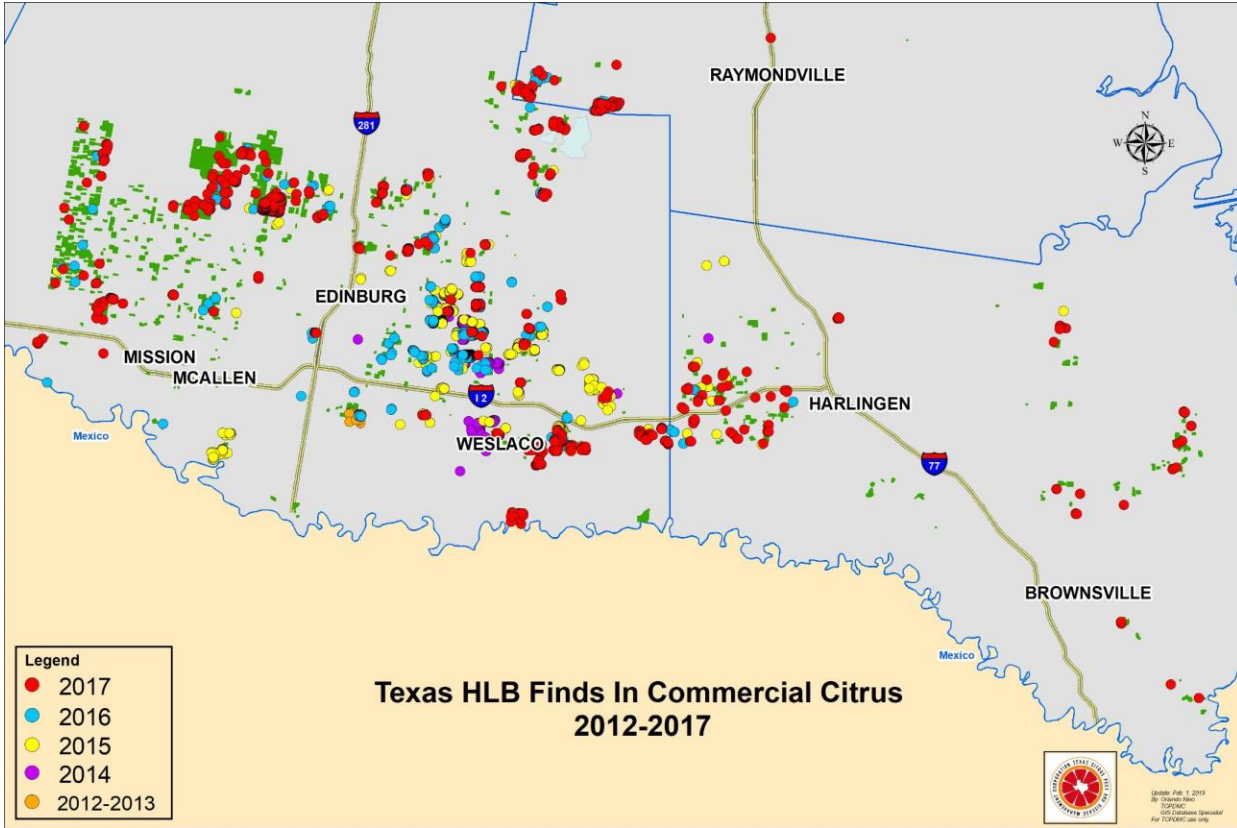
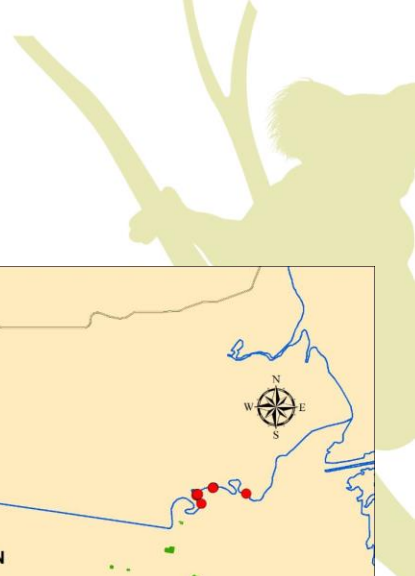


2024 Citrus
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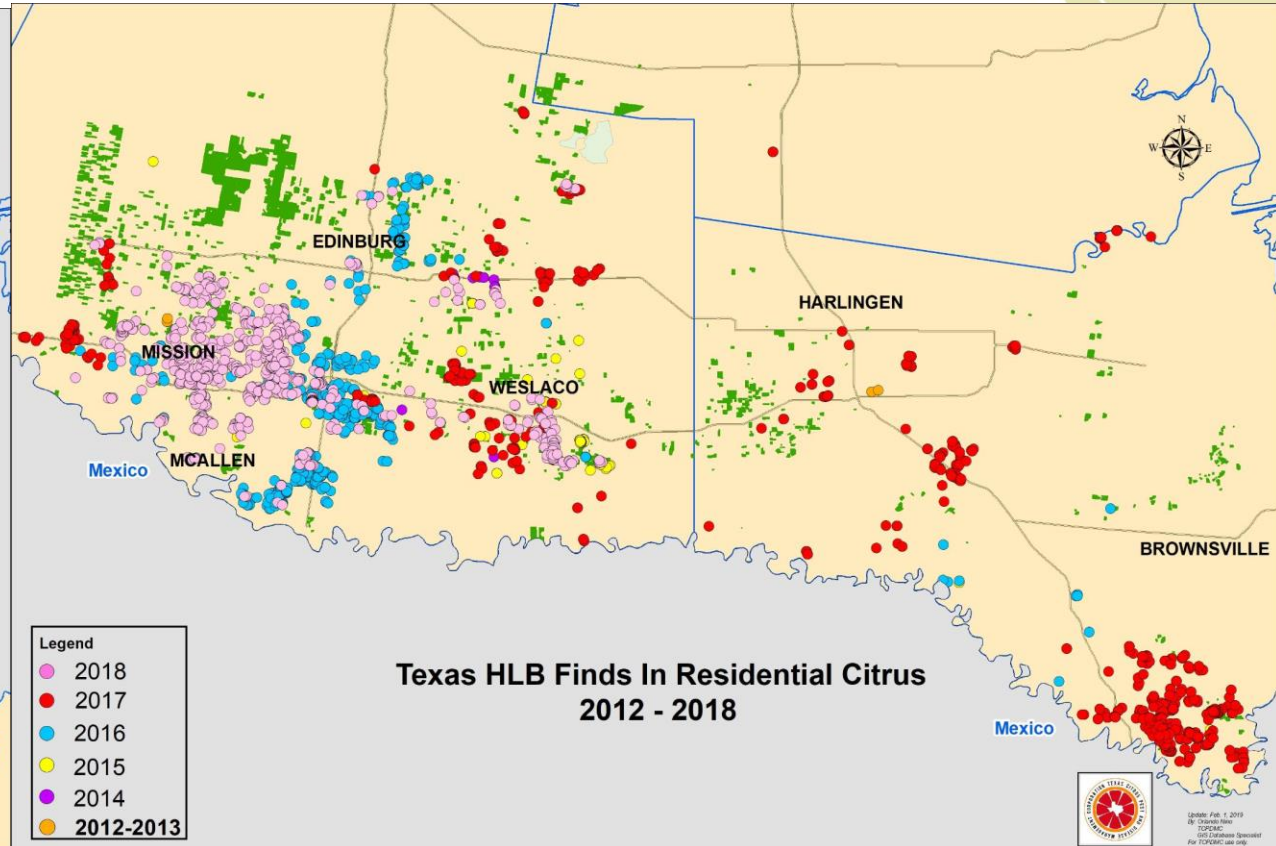
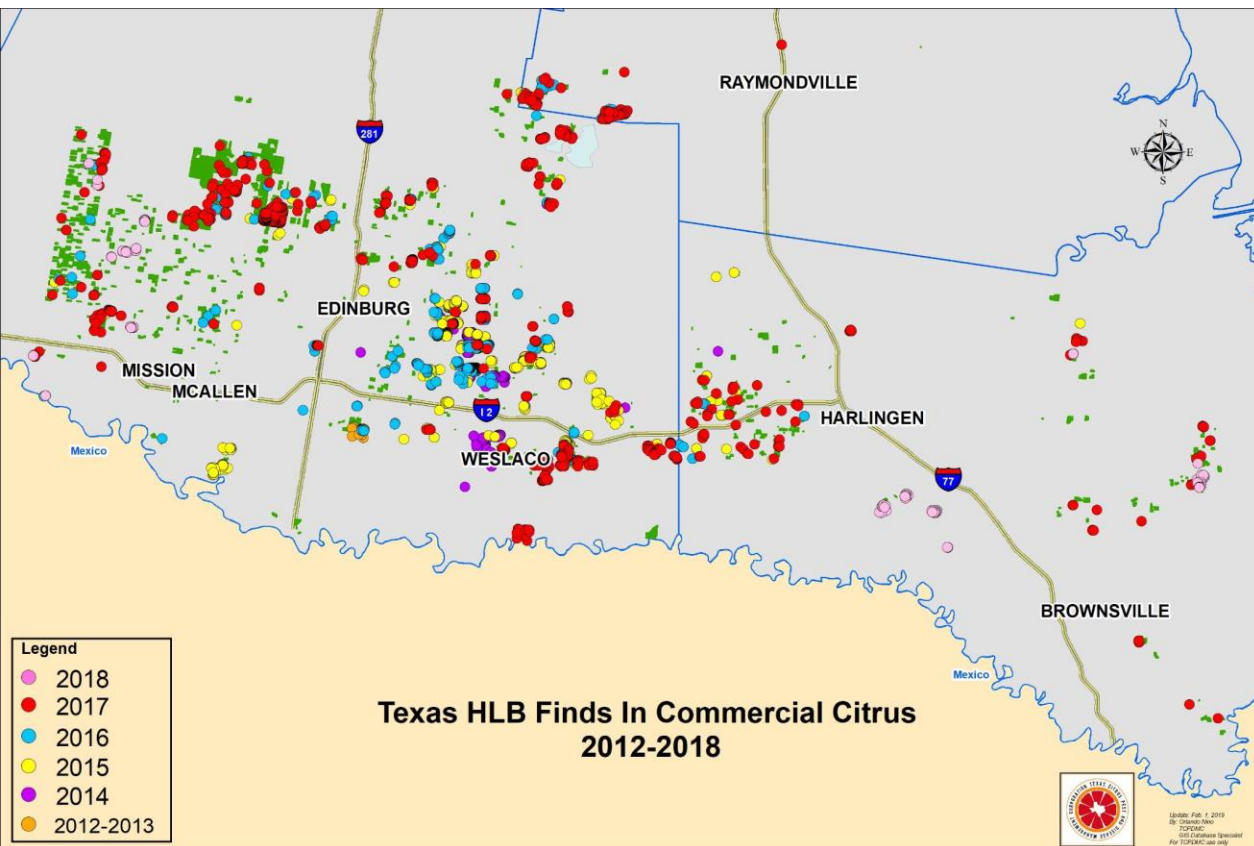
2012 - 2016



2012 - 2017



2012 - 2018



Mistakes We Made

- Not working to control ACP when first found
- Forced removal of homeowner trees during CC eradication
- Not recognizing two citrus Industries
- Being Reactive vs. Proactive

Suggestions to Consider



Consider Citizen Science

- Develop an AU Citrus Disease ID Phone App
- Work with Homeowners & Growers to take/submit pics of insects and disease on citrus trees
- These will need to have time, date and GPS stamps
- Use AI Technology to ID
- Look for trends
- Follow up on trends with visual inspection
- Evaluate and act quickly



Suggestions for Inspection Protocol- Residential

- Inspect citrus in residential areas near ports of entry
- Work with homeowners to access citrus in these areas for trapping
- Set insect traps in these areas
- Consider trap plants near ports of entry
 - *Murraya Paniculata* with systemic Insecticides
- Test ACP for CLas



Suggestions for Actions if Disease Found- Residential

- Ask for voluntary removal
 - Perhaps offer an alternative replacement
- If refusal to remove & ACP / no HLB
 - Strip all fruit & treat with systemic insecticides.
- If refusal to remove & ACP & HLB
 - Consider trunk injections as bactericide as control
- Perhaps alternative options??

Suggestions for Inspection Protocol- Growers

- Learn to ID and where on tree to look for ACP
- Inspect citrus orchards at corners and along edges & roads
- Perhaps use "The Citrus Disease App"
- Adjust pesticide program to control ACP
- Set insect traps, monitor, collect and record data
- ACP host plants not necessary should be removed
 - Gardens, hedges & abandoned citrus orchards

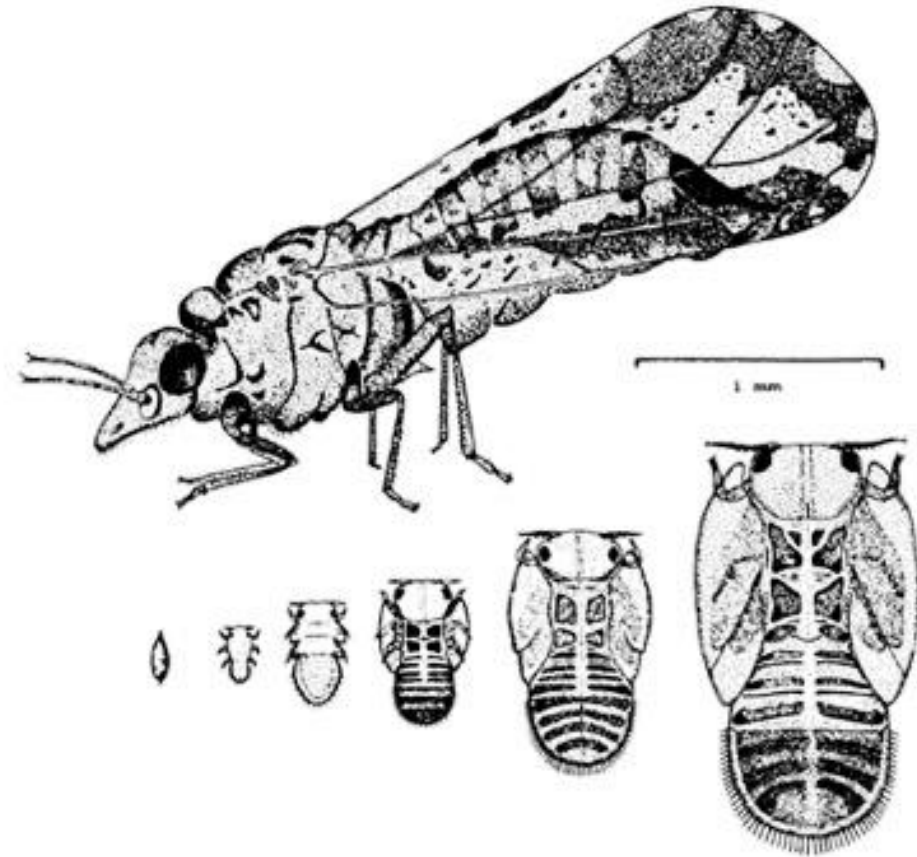
Suggestions for Actions if Disease Found-Growers

- Agree as an industry to remove suspect trees
 - This does not have to be a long-term commitment
 - It's a starting point while risk assessment is performed
- Consider OTC injections in surrounding area ASAP
 - Strip all fruit & treat with systemic insecticides
- Make sure chemical applications have good coverage of all new flush
- Perhaps alternative options??

Know Your Enemy!

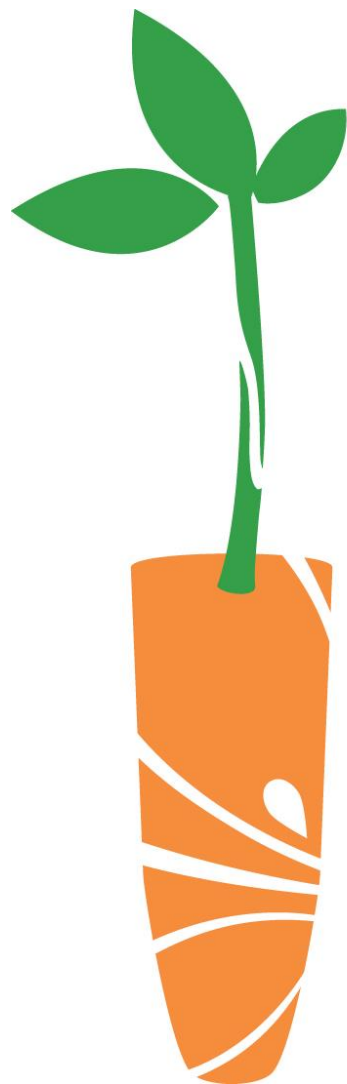
Asian Citrus Psyllid (ACP)

Diaphorina citri



International Society of Citrus Nurseries

- www.ISCN.co
- Next Congress in Chile August 2025
- New Website Under Construction



ISCN

INTERNATIONAL SOCIETY
OF CITRUS NURSEYMEN



Thank you for listening!

