The Importance of Inter-Regional Standards and Coordination for Detection, Phytosanitary Alert and Timely Control of Pests of Quarantine Significance

Kitty F. Cardwell, PhD
CSREES, USDA, Washington, DC
International Workshop on Citrus Quarantine
Villahermosa, Tabasco, Mexico
July 27-31, 2009

Purpose of this Presentation

- What is needed for early detection
- How phytosanitary alerts promote early detection
- What happens when quarantine pests can’t be eradicated?
- How soybean rust is related to citrus quarantine pests
- Monitoring and management options
- The call for a unified North and Meso-American Citrus Pest Management System

National Plant Diagnostic Network Mission

– The mission of the NPDN is to protect US agricultural and natural plant systems by:

- Facilitating early detection of pests and pathogens through outreach and education of first detectors,
- Performing rapid and accurate diagnoses,
- Ensuring timely reporting, and
- Supporting response through partnerships and coordinated surge capacity.

GPDN

NCPDN
North Central Plant Diagnostic Network

WPDN
Western Plant Diagnostic Network

NEPDN
Northeast Plant Diagnostic Network

SPDN
Southern Plant Diagnostic Network

National Repository
CERIS

Figure 1. The National Plant Diagnostic Network (NPDN) is Administered by Five Regional Centers Located in Universities

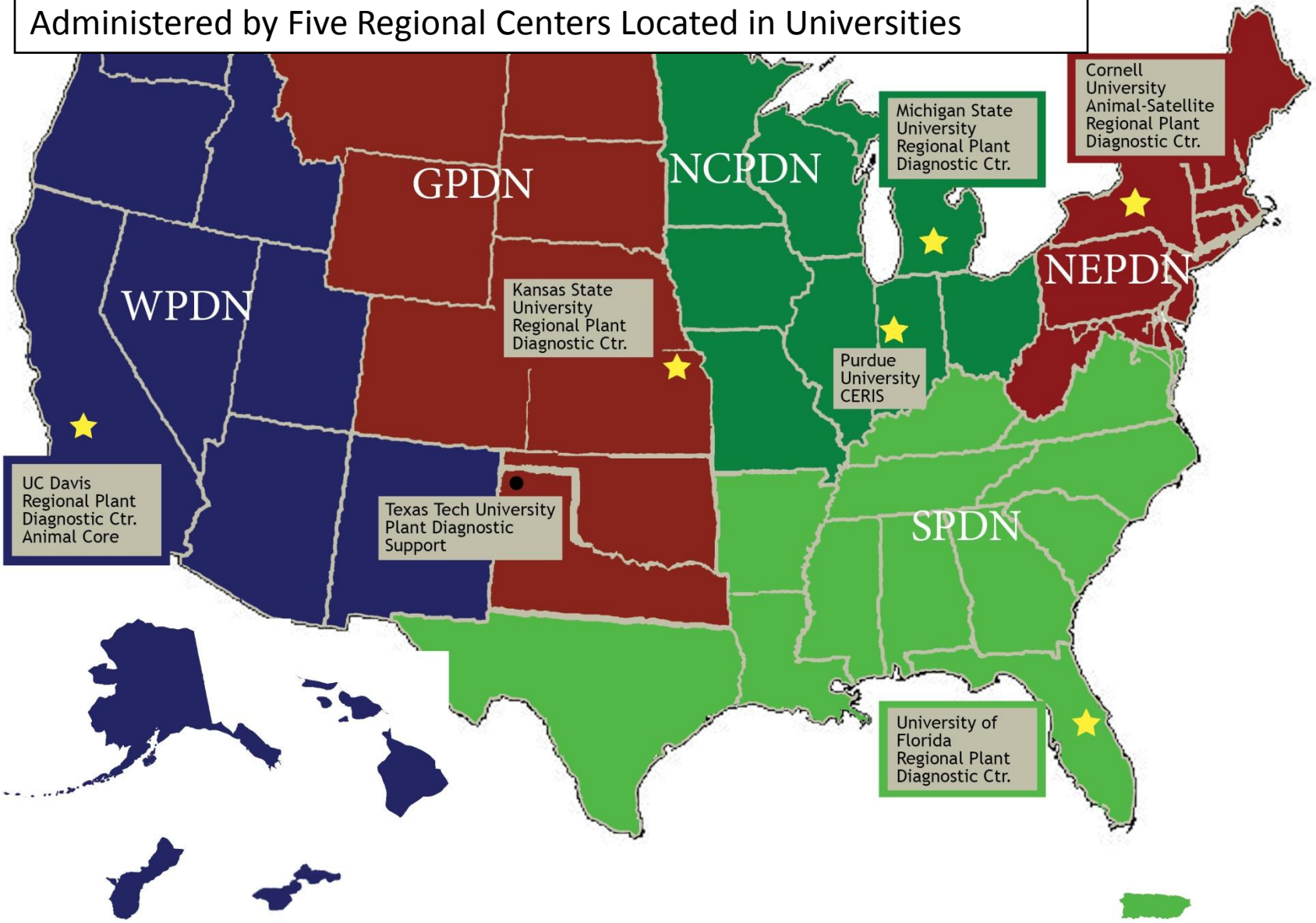


Figure 2. Regional Diagnostic Centers Push Data into a Central Repository in CERIS, at Purdue University

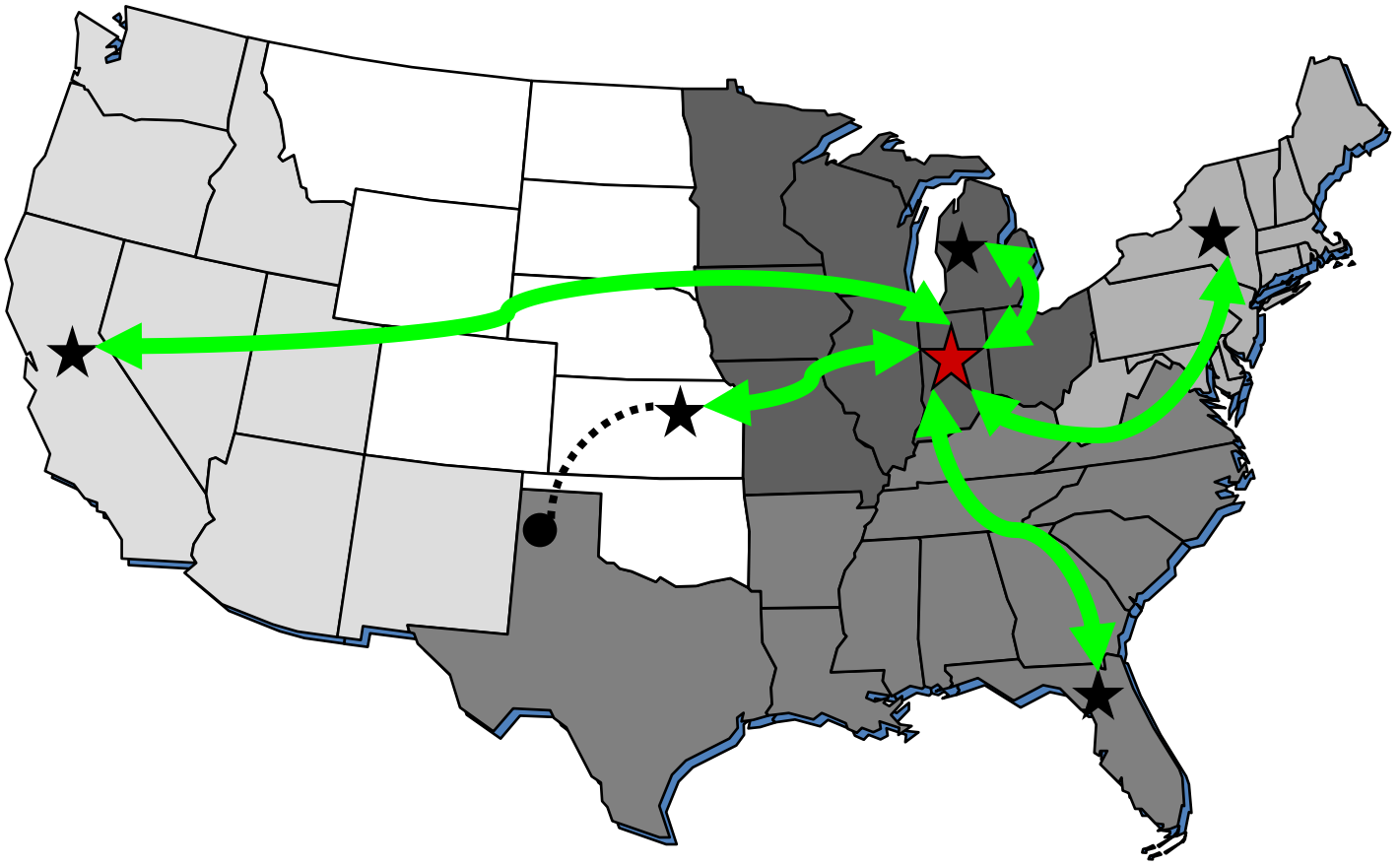


Figure 3. Regional Diagnostic Centers Serve As Central Point for Information Flow from within the State

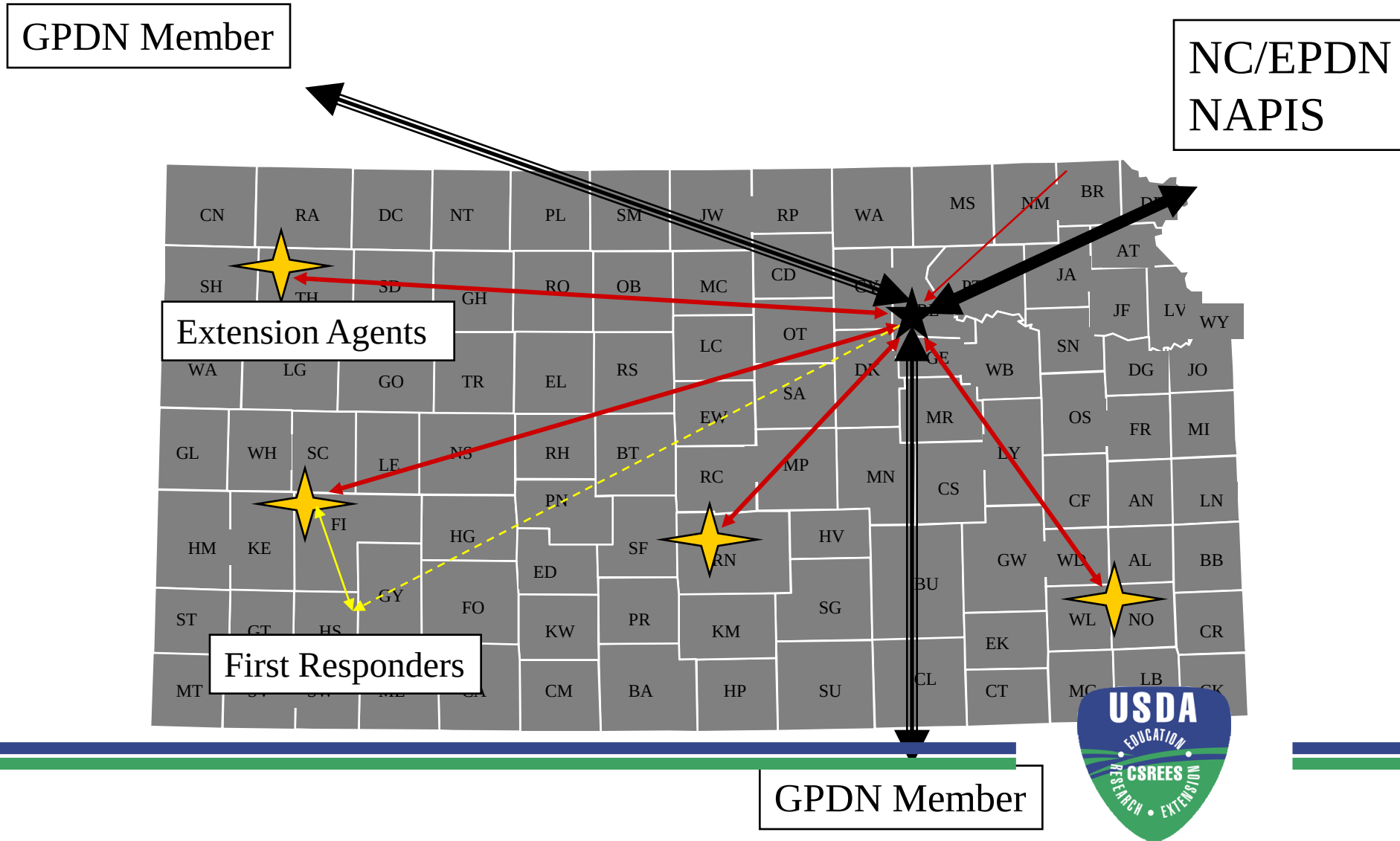


Figure 4. Each NPDN Regional Center Serves as a Central Hub for Advanced Diagnostics & Information Flow Creating Expanded Capacity for High Consequence Events and Rapid Turn-around for Diagnostics

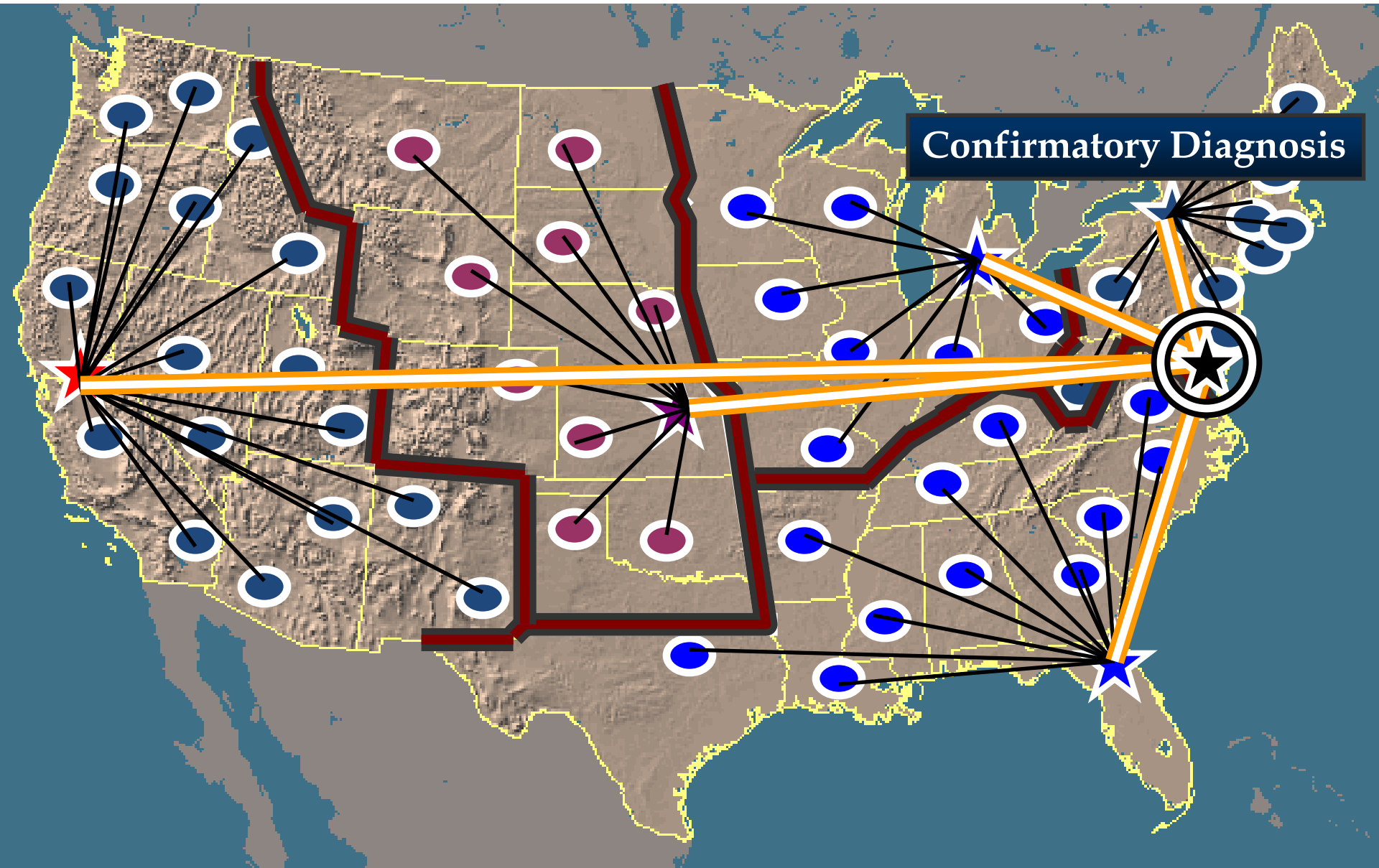


Table 1. National Plant Diagnostic Network 2008 Sample Type, Distribution, and National Data Repository Submission Numbers from the Western (WPDN), North Central (NCPDN), Southern (SPDN), Great Plains (GPDN) and North East (NEPDN) Diagnostic Laboratories

Region (# of labs)	Samples Processed	Pathogen	Insect	Weed	Nematode	Other	Repository Submissions June 1 2008- April 1, 2009	CERIS reported submissions 2008
WPDN (17)	268,635	166,667	79,390	2,015	10,944	8,151	26,169	20,266
NCPDN (8)	17,910	6,916	2,319	219	5,152	1,651	12,186	10,335
SPDN (14)*	33,574	15,721	2,568	680	9,762	2,824	17,484	23,172
GPDN (9)	15,957	10,618	2,062	404	990	0	15,692	15,898
NEPDN (13)	9,136	4,217	830	178	435	0	7,918	10,335
Totals (61)	345,212	345,649	87,169	3,496	27,283	12,626	79,449	85,186

Table 2. Proportion of Samples Confirmed, Suspected, Inconclusive, Not Detected by the North East (NEPDN), North Central (NCPDN), Southern (SPDN), Great Plains (GPDN), and Western (WPDN) Plant Diagnostic Network Laboratories

	Confirmed	Suspected	Inconclusive	Not Detected	Total
NEPDN	4703	2225	276	714	7918
NCPDN	7279	1997	614	2296	12186
SPDN	8880	3112	2189	3303	17484
GPDN	6878	2657	985	5172	15692
WPDN	23568	930	339	1332	26169
Totals	27740	9991	4064	11485	53280
Proportion	0.52	0.19	0.08	0.22	1

The Importance of Phytosanitary Alerts

- First Detector Network News : The newsletter for the NPDN First Detector Community http://www.sepdn.org
- NPDN Diagnostics SOPS and Training
- First Detector and FD Educators: modules and manuals http://cbc.at.ufl.edu
- **Laboratory surge preparation:**

Models, Monitors, Maps and Management

- Established pests and diseases need on-going management
- Farmers are the ones who manage them, whether regulatory, invasive or endemic
- Accurate information is crucial to effective control
- Extension agents and scientists need a way to inform farmers about risk and control options

Figure 6. Arrival of Hurricane Ivan September, 2005, Brought an Unwelcome Guest

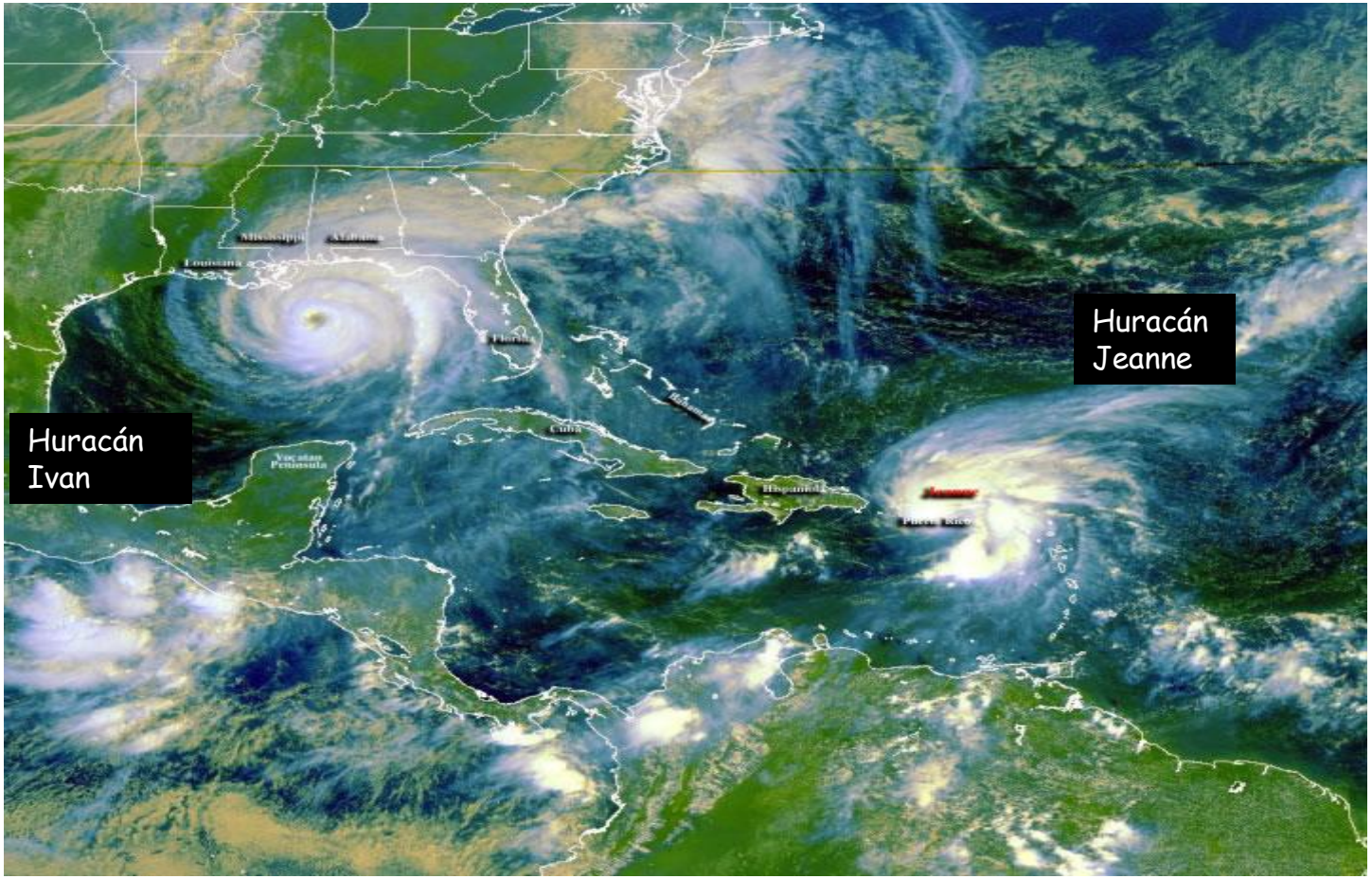
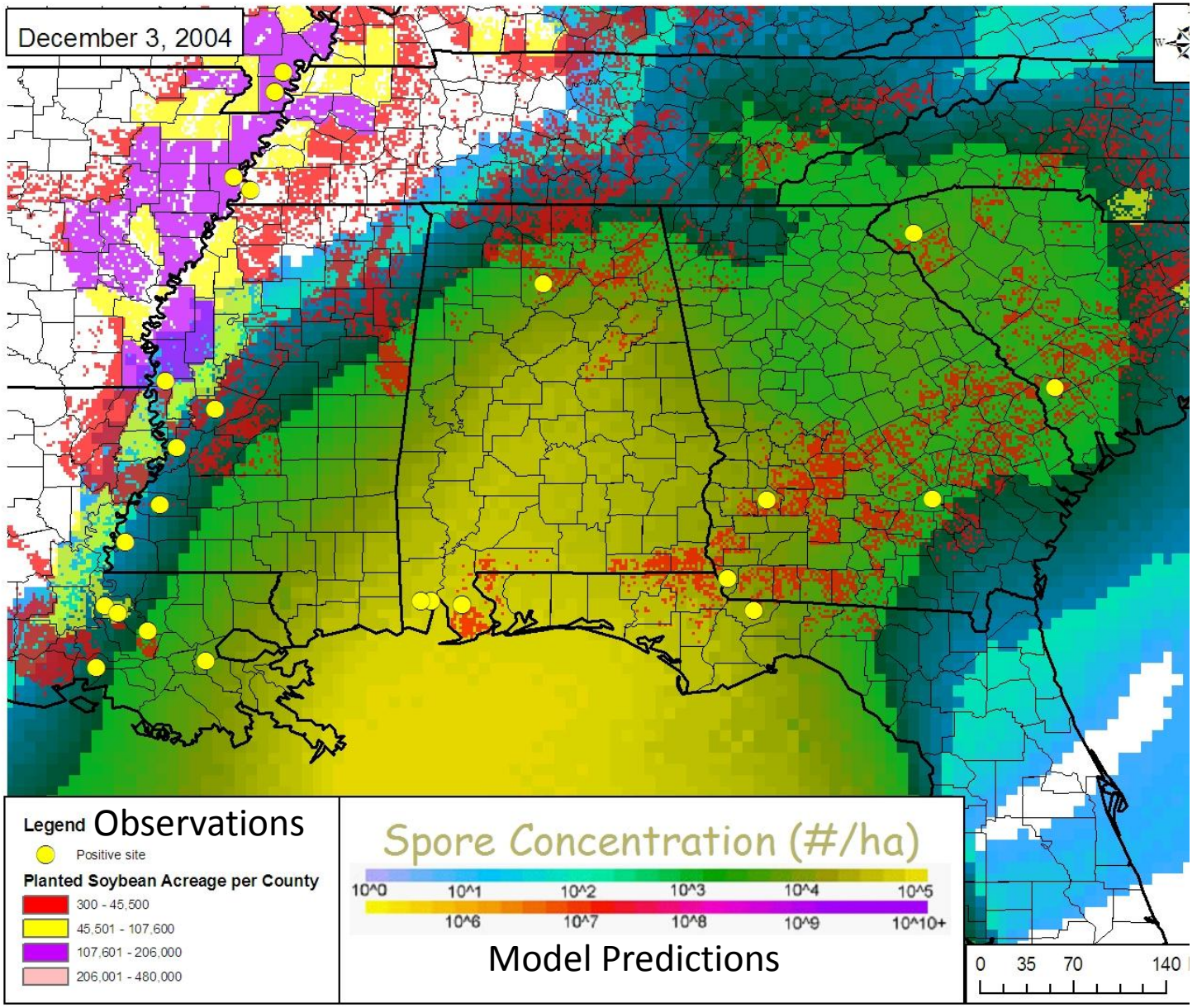


Figure 7. Models predicted Soybean Rust Spore Delivery on Hurricane Ivan

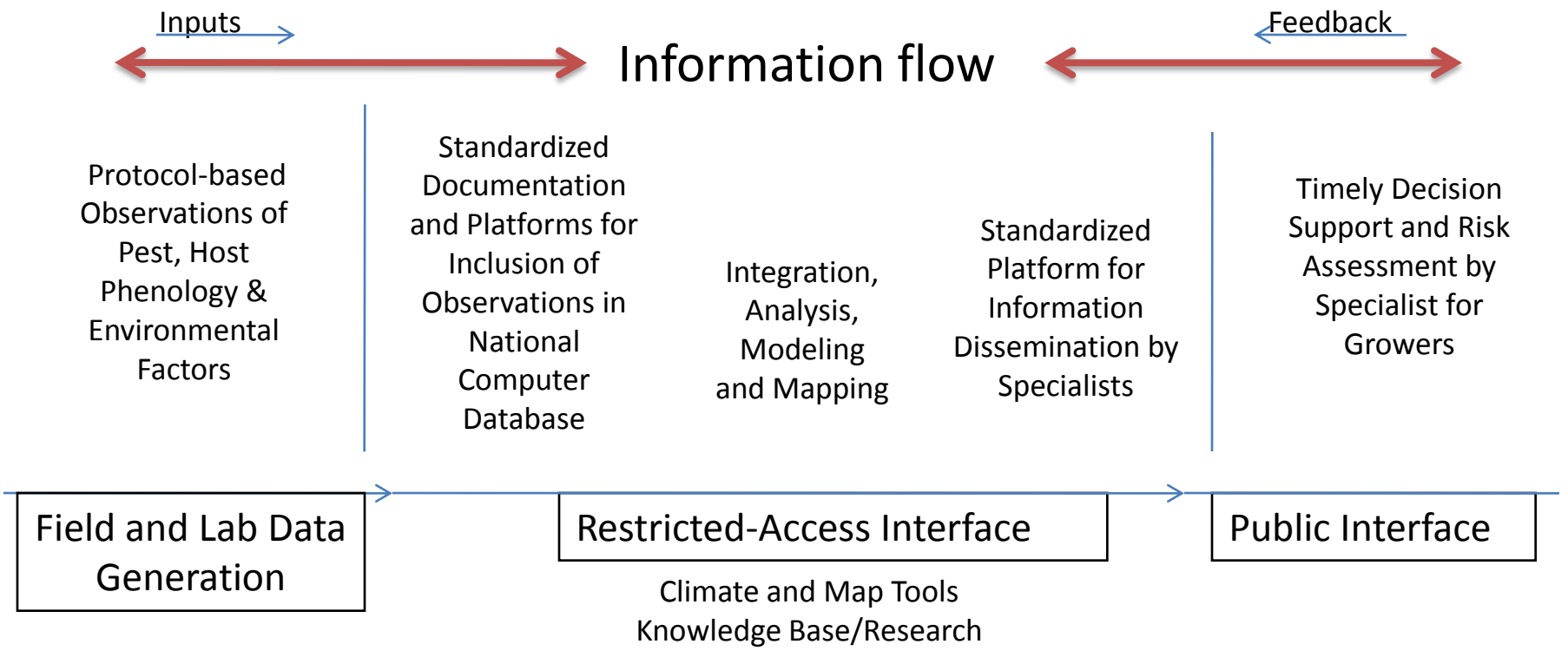
Figure 7. Rust Incursion into Southeastern U.S. Defined by the Hurricane Impact Zone



Integrated Frameworks

- Pest Information Platform for Extension and Education
- Sistema Coordinado de Operaciones para el Manejo de Plagas Reglamentadas y su Epidemilogia

Figure 9. Pest Information Platform for Extension & Education (PIPE)



People and computers linked by “state-of-the-art” Information Technology

Sentinel Plot Monitoring

First Detector Training, Florida

Scouting in Chiapas, Mexico

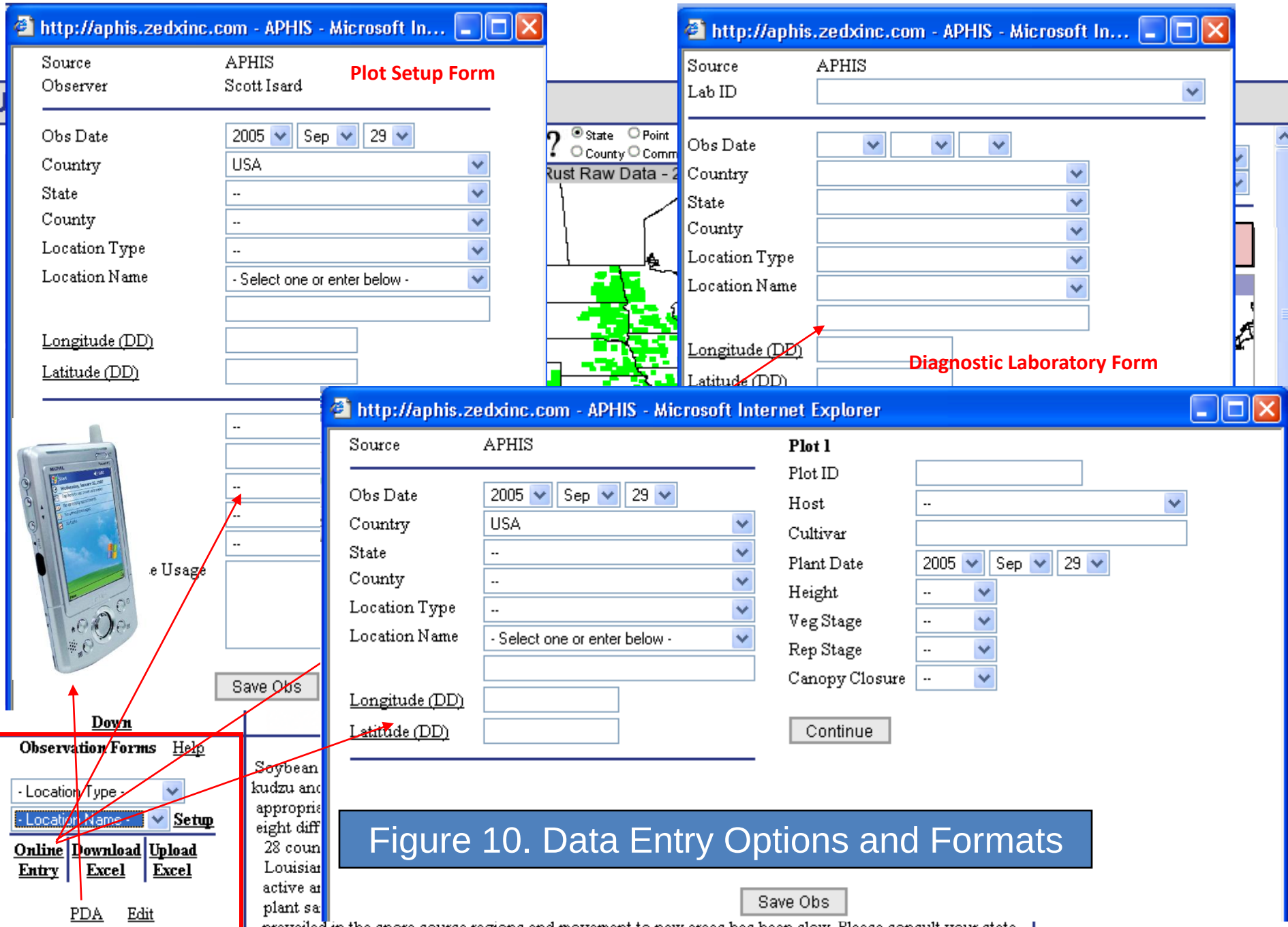
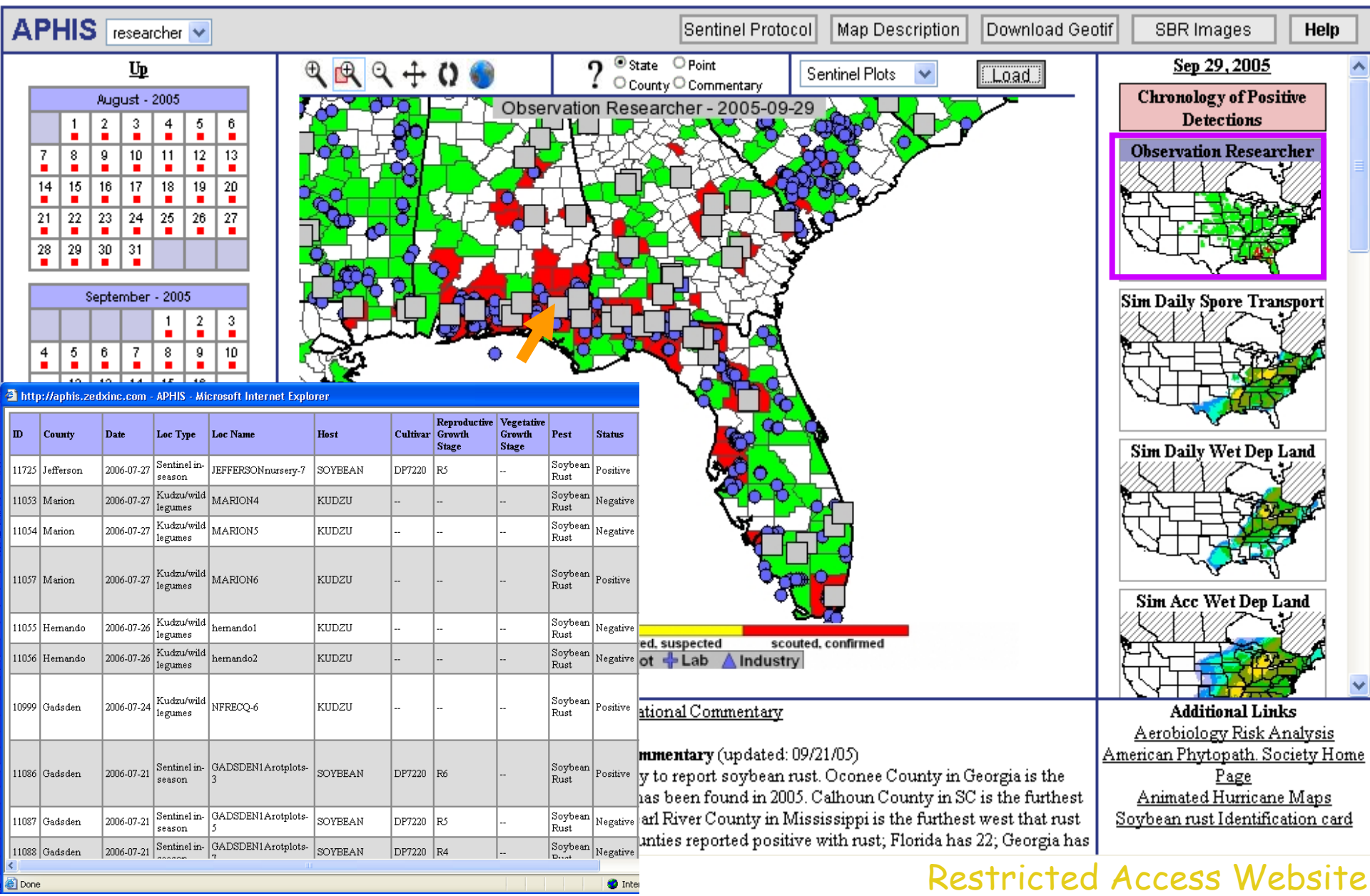


Figure 10. Data Entry Options and Formats

Figure 11. Data Manipulation and Access



ID	County	Date	Loc Type	Loc Name	Host	Cultivar	Reproductive Growth Stage	Vegetative Growth Stage	Pest	Status
11725	Jefferson	2006-07-27	Sentinel in-season	JEFFERSONnursery-7	SOYBEAN	DP7220	R5	--	Soybean Rust	Positive
11053	Marion	2006-07-27	Kudzu/wild legumes	MARION4	KUDZU	--	--	--	Soybean Rust	Negative
11054	Marion	2006-07-27	Kudzu/wild legumes	MARION5	KUDZU	--	--	--	Soybean Rust	Negative
11057	Marion	2006-07-27	Kudzu/wild legumes	MARION6	KUDZU	--	--	--	Soybean Rust	Positive
11055	Hernando	2006-07-26	Kudzu/wild legumes	hernando1	KUDZU	--	--	--	Soybean Rust	Negative
11056	Hernando	2006-07-26	Kudzu/wild legumes	hernando2	KUDZU	--	--	--	Soybean Rust	Negative
10999	Gadsden	2006-07-24	Kudzu/wild legumes	NFRECQ-6	KUDZU	--	--	--	Soybean Rust	Positive
11086	Gadsden	2006-07-21	Sentinel in-season	GADSDEN1Arotplots-3	SOYBEAN	DP7220	R6	--	Soybean Rust	Positive
11087	Gadsden	2006-07-21	Sentinel in-season	GADSDEN1Arotplots-5	SOYBEAN	DP7220	R5	--	Soybean Rust	Negative
11088	Gadsden	2006-07-21	Sentinel in-season	GADSDEN1Arotplots-7	SOYBEAN	DP7220	R4	--	Soybean Rust	Negative

Restricted Access Website

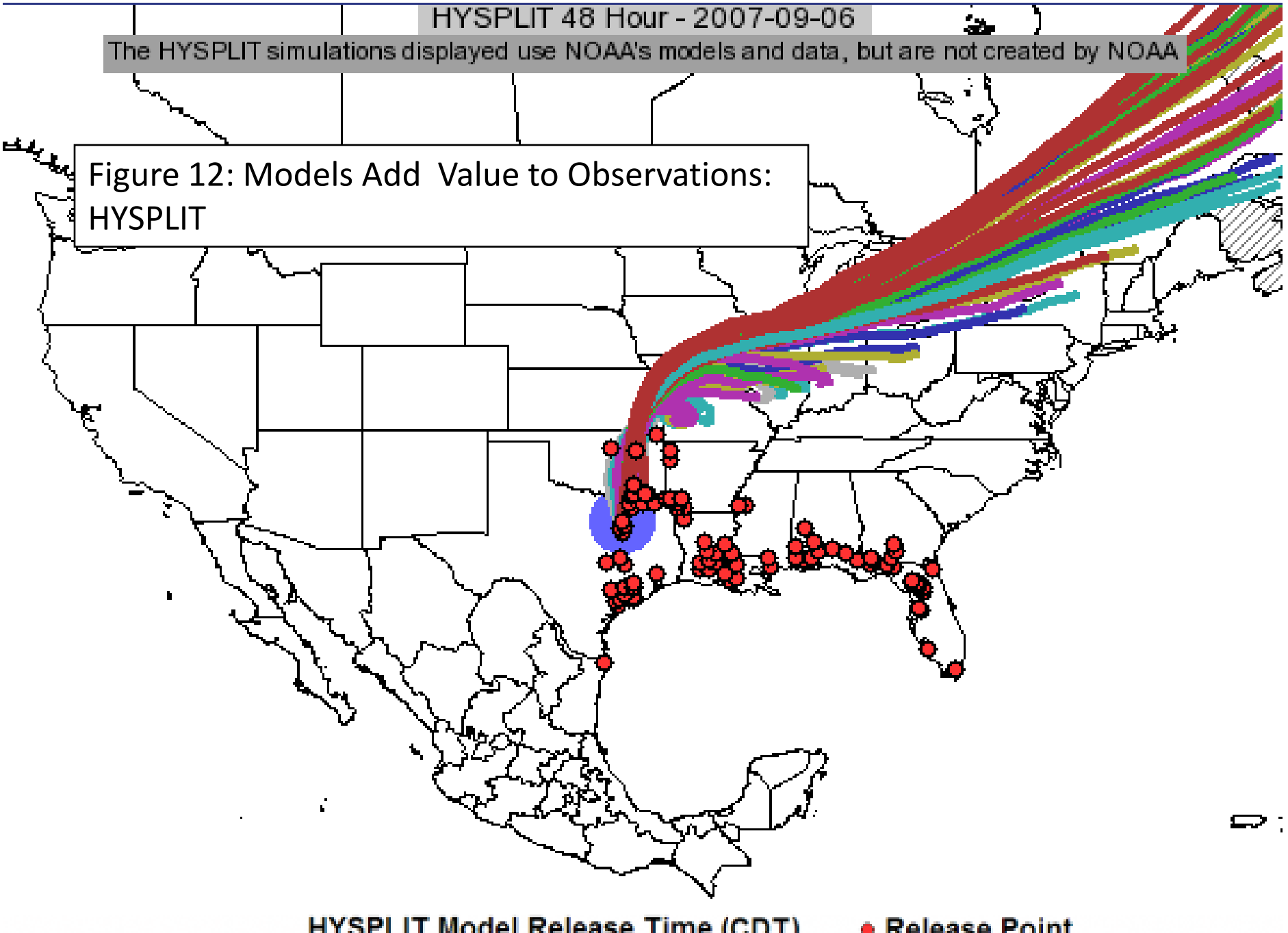
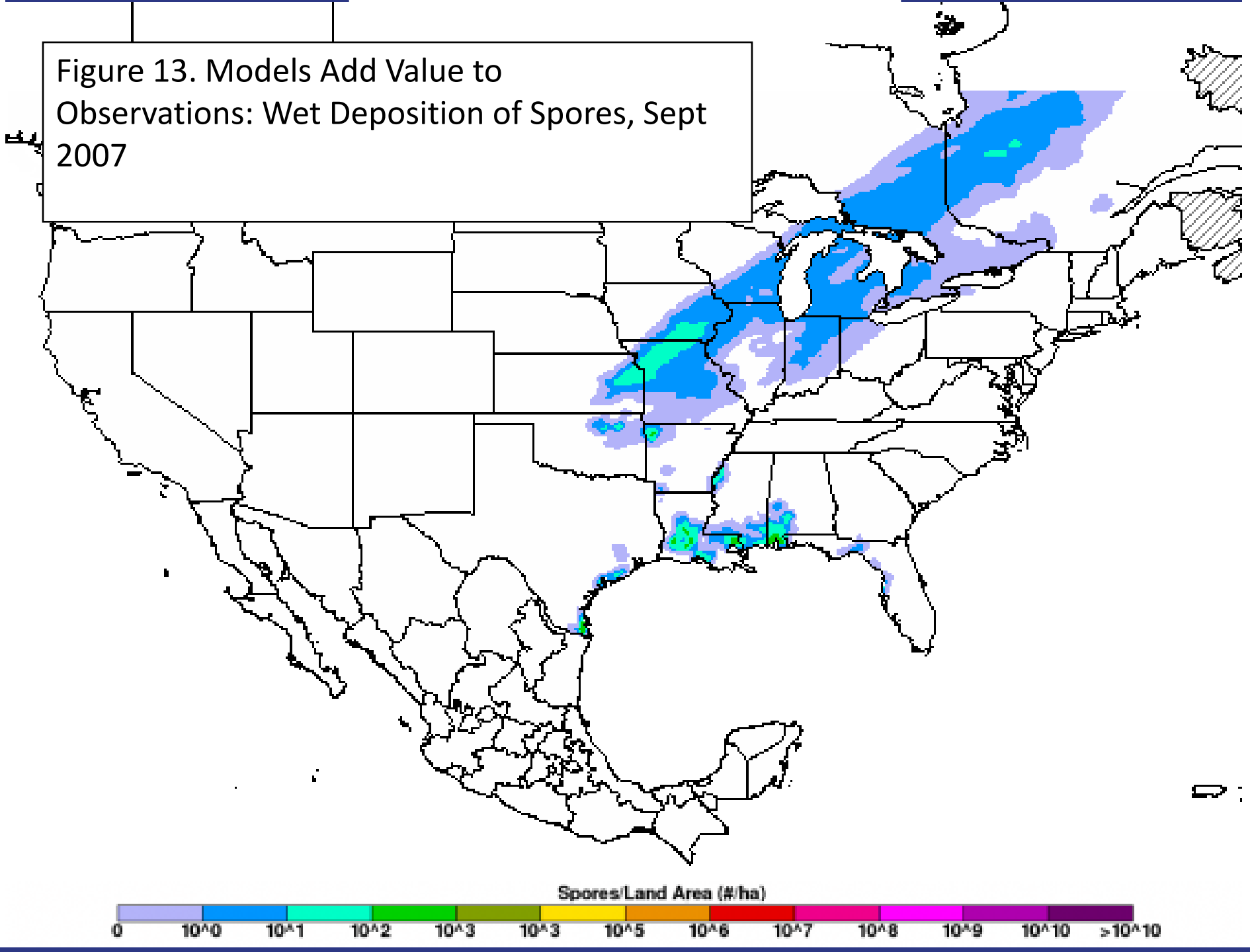


Figure 12: Models Add Value to Observations: HYSPLIT

Figure 13. Models Add Value to Observations: Wet Deposition of Spores, Sept 2007



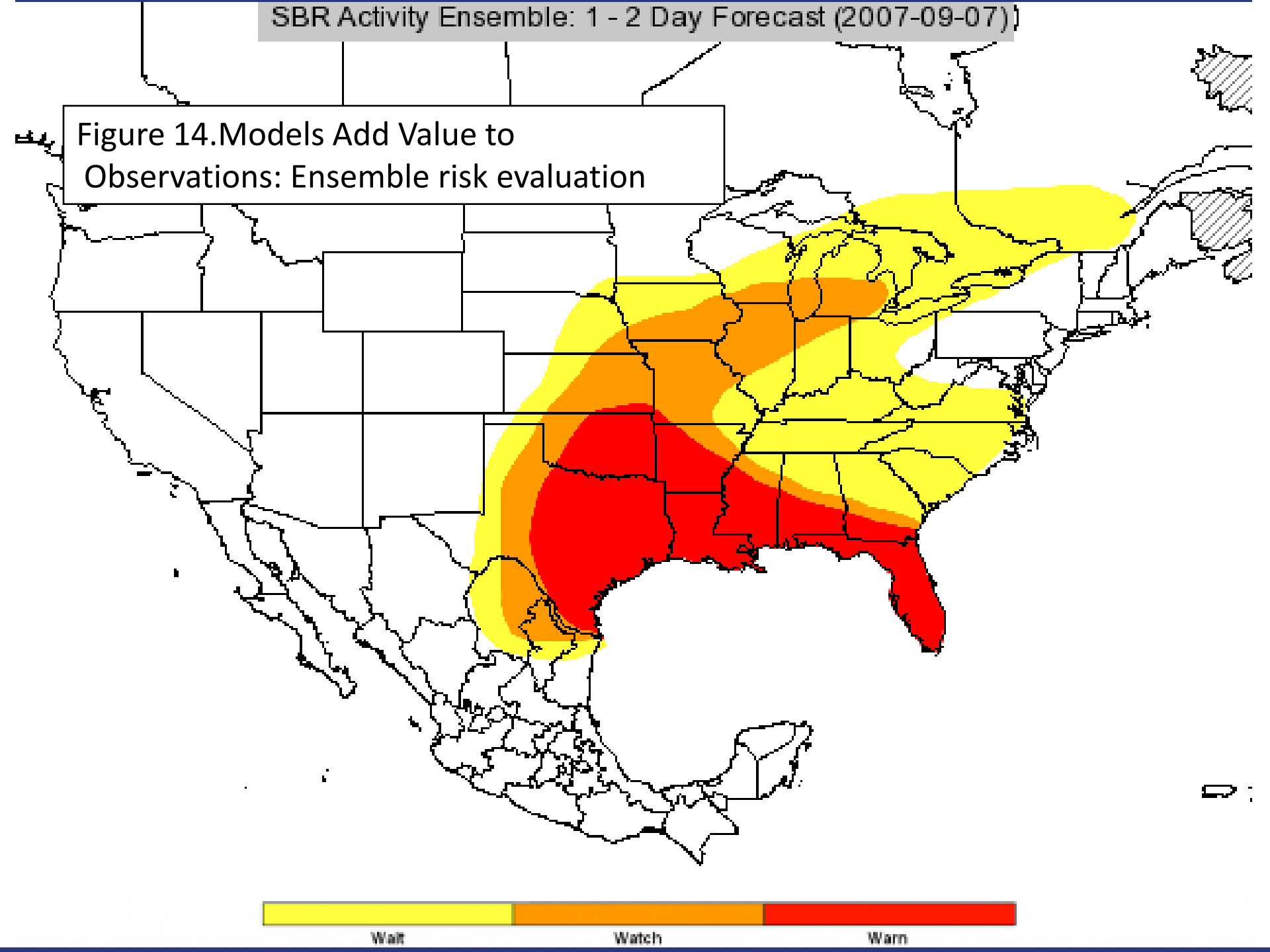
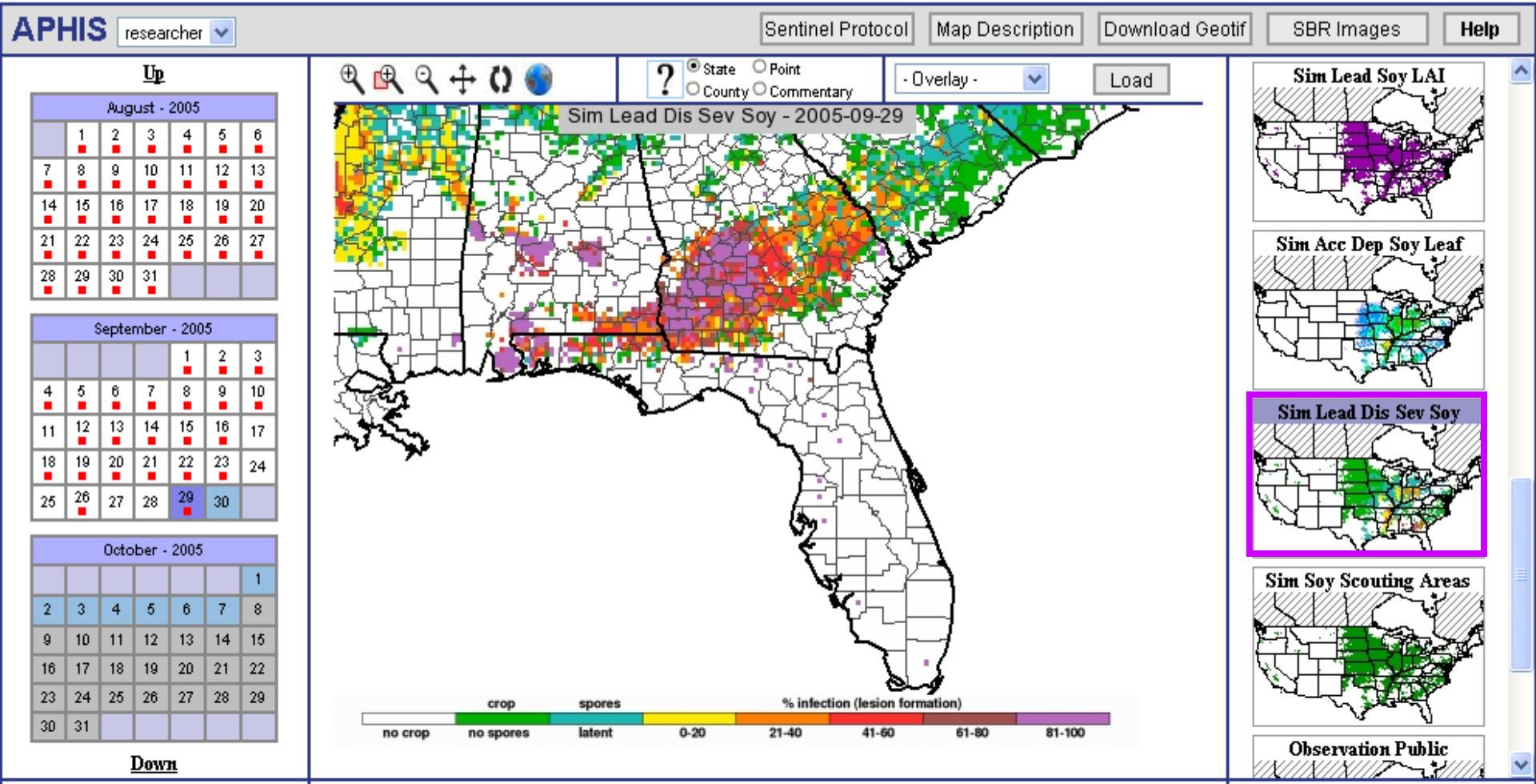
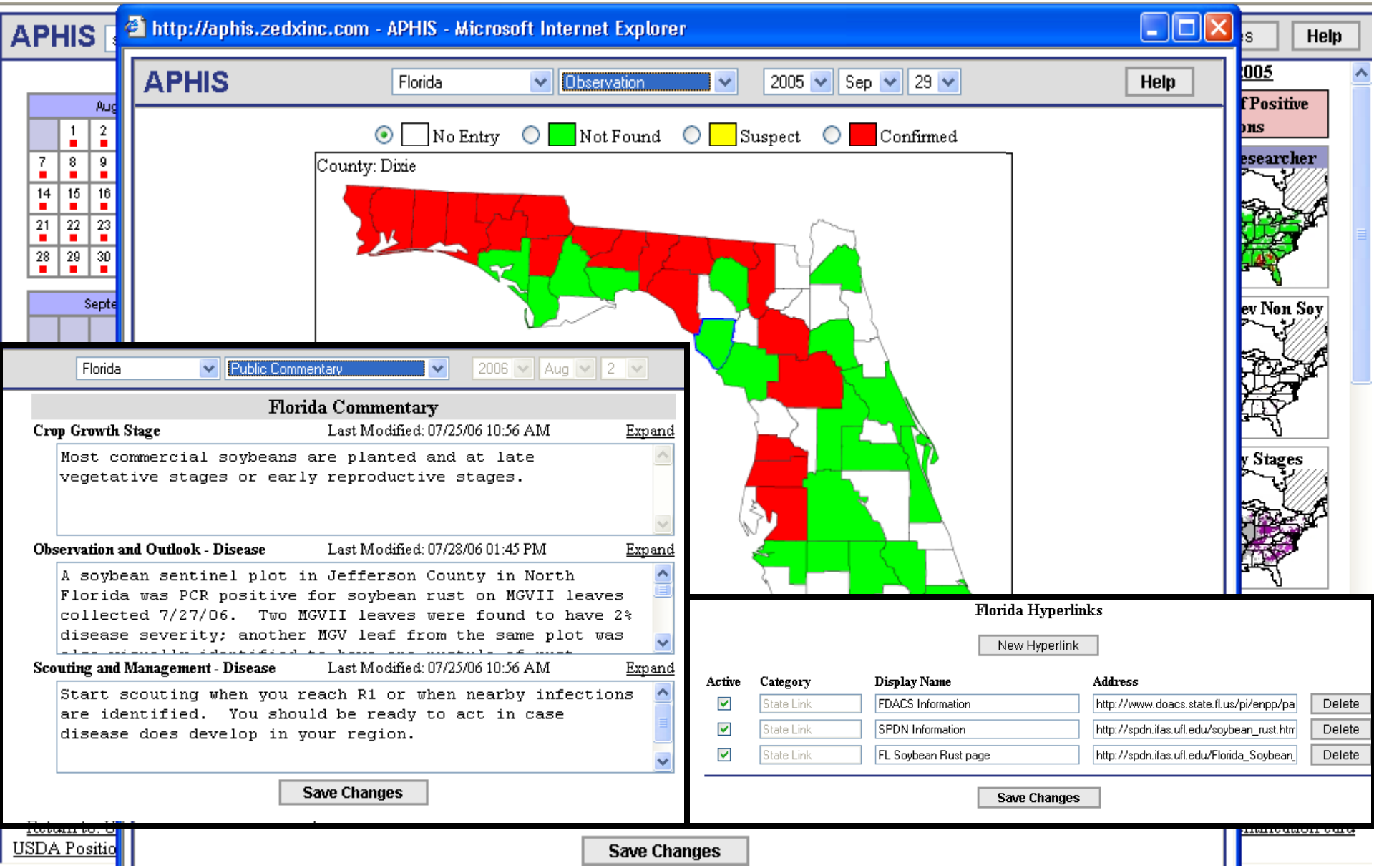

SBR Activity Ensemble: 1 - 2 Day Forecast (2007-09-07)
Figure 14.Models Add Value to Observations: Ensemble risk evaluation
Watch
Warn

Figure 15. Models Add Value to Observations: Simulated Disease Severity



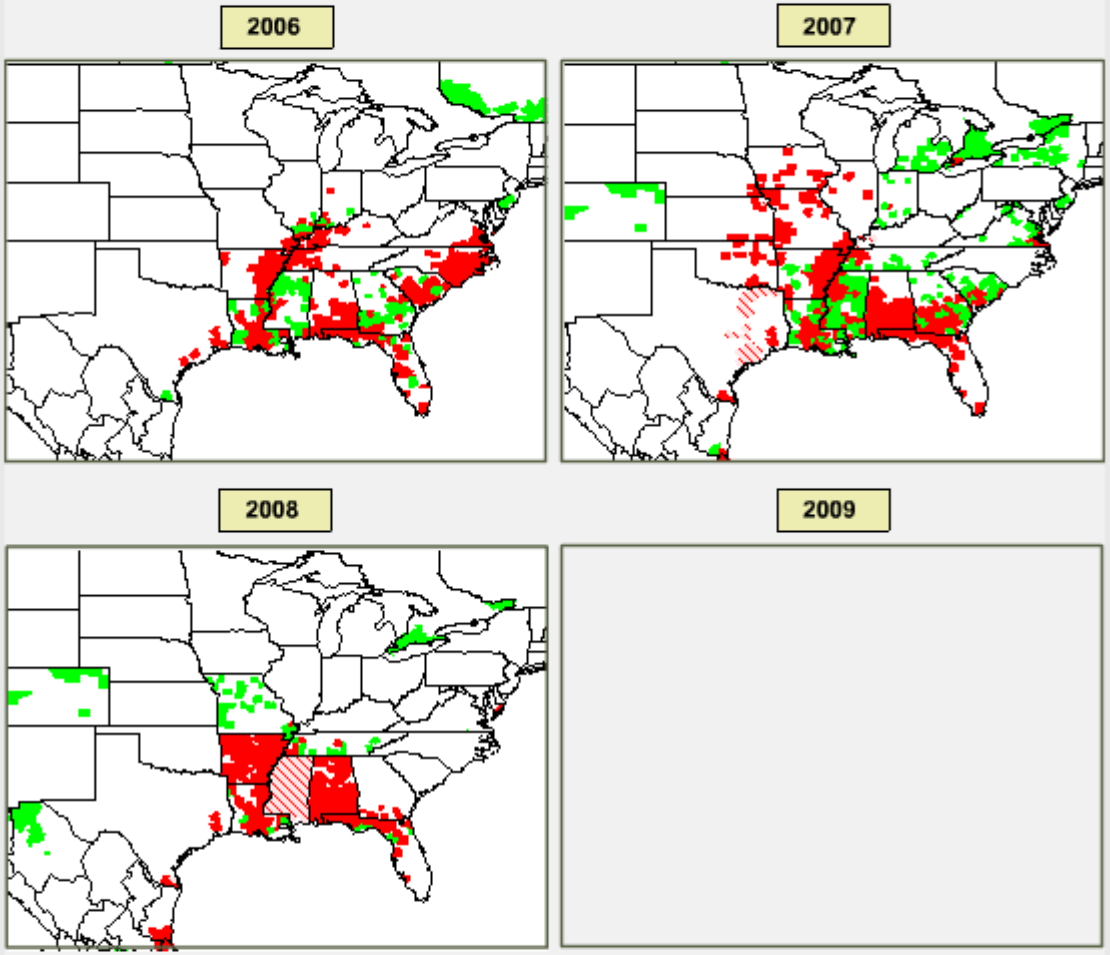
Restricted Access Website

Figure 16. Communications Tools for Specialists; Maps and Text Upload



IAMS
Ensemble Forecasting
Historical Risk Assessment
Epidemiology
Spore Exposure
Canopy Escape
Spore Deposition
Infection Timeline
Spore Trapping
PIPE
Blog
Ragweed
International Collaboration
Forecasting Model
Discussion Group
UG99 - TKKS Wheat Stem Rust
Risk of Incursion
Preparing for Incursion
Pest Detection
Citrus Greening
Grasshopper
Facilities
Personnel
Publications
Links
Home

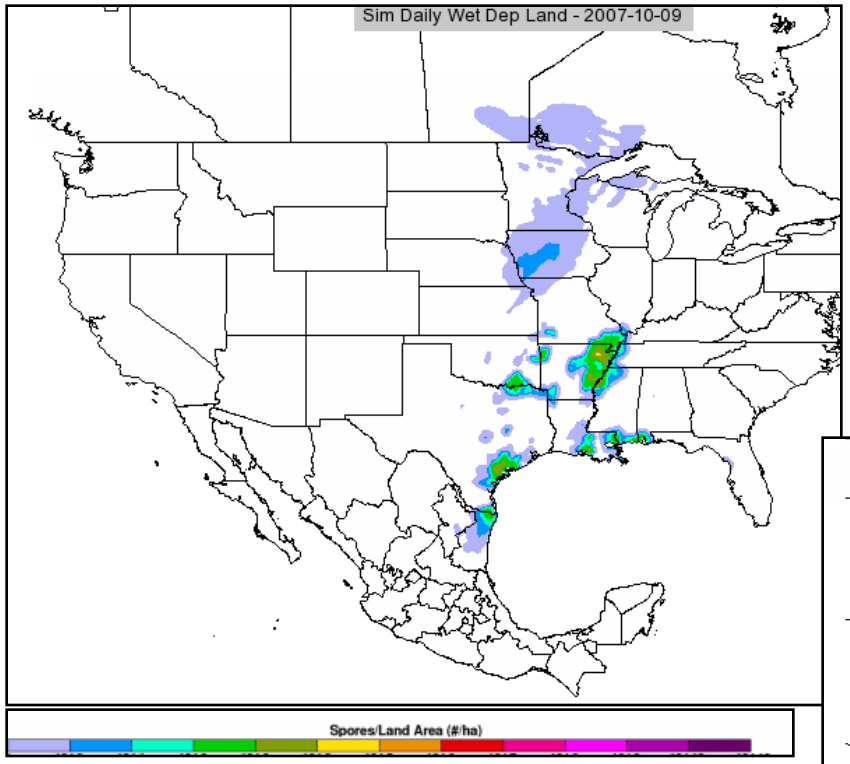
These four animations depict counties with confirmed observations of soybean rust infections in soybean and/or Kudzu for 2006, 2007, 2008, and 2009. The frames were extracted from the 2006, 2007, 2008, and 2009 Pest Information Platform for Extension and Education (PIPE) at weekly intervals.



Source Region Monitoring

- What if the source region of a pest or disease is far from where the management must occur?
- What if the infection is polyetic and trans-regional?
- Do national borders stop pests?
- The United States and Mexico share contagion
- Citrus diseases and vectors are trans-regional.

Figure 18. Simulated Transport (HYSPLIT) and Daily Wet Deposition on October 9th, 2007



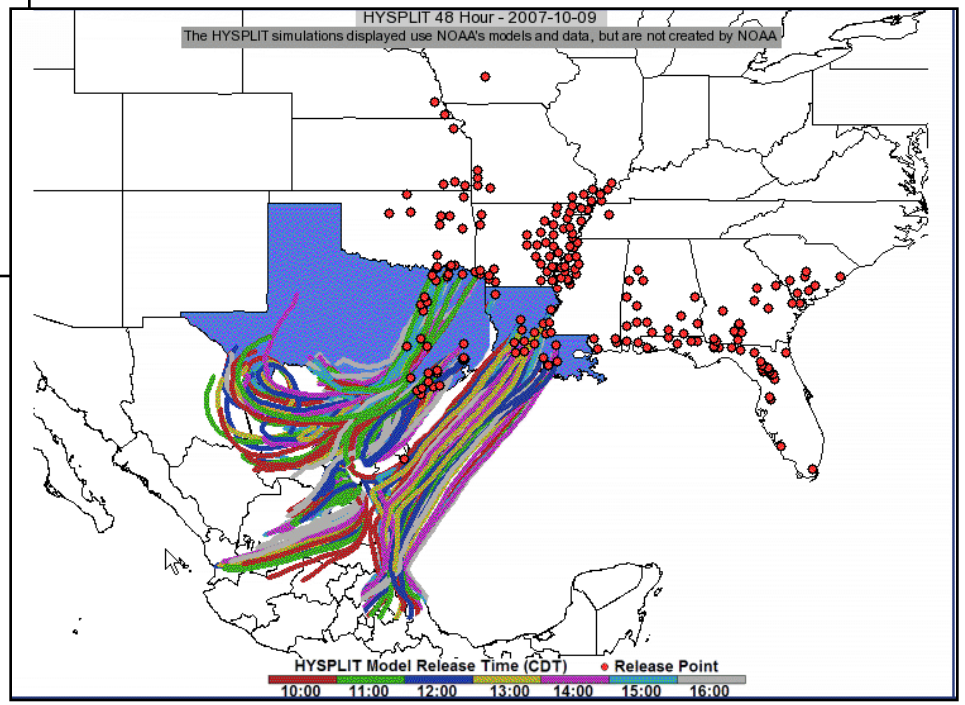
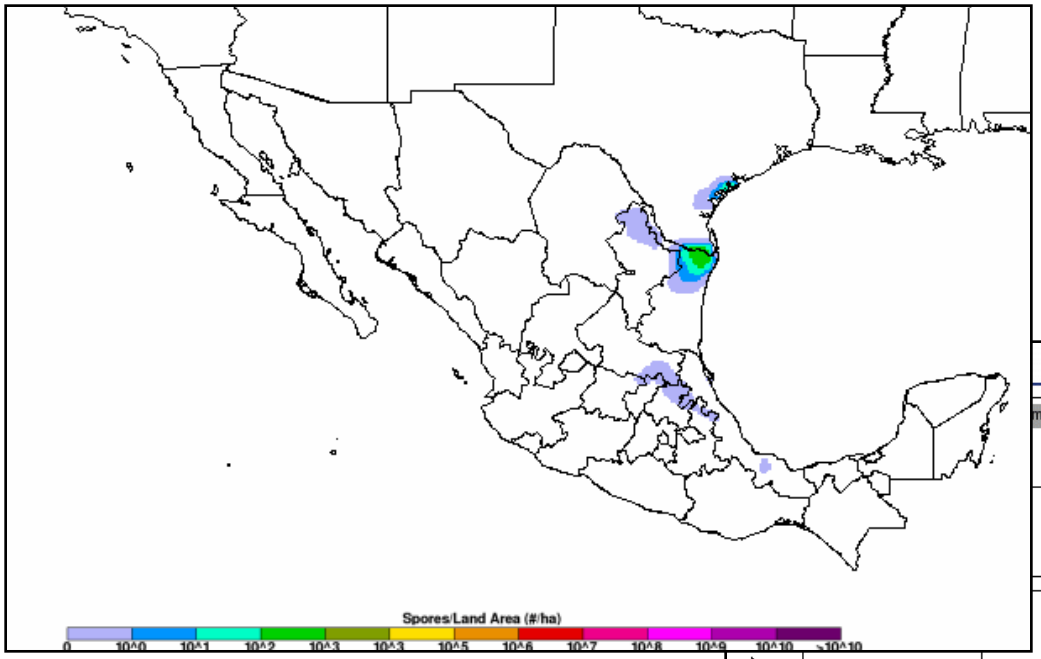


Figure 19. Simulated Transport (HYSPLIT) and Daily Wet Deposition on October 11th, 2007



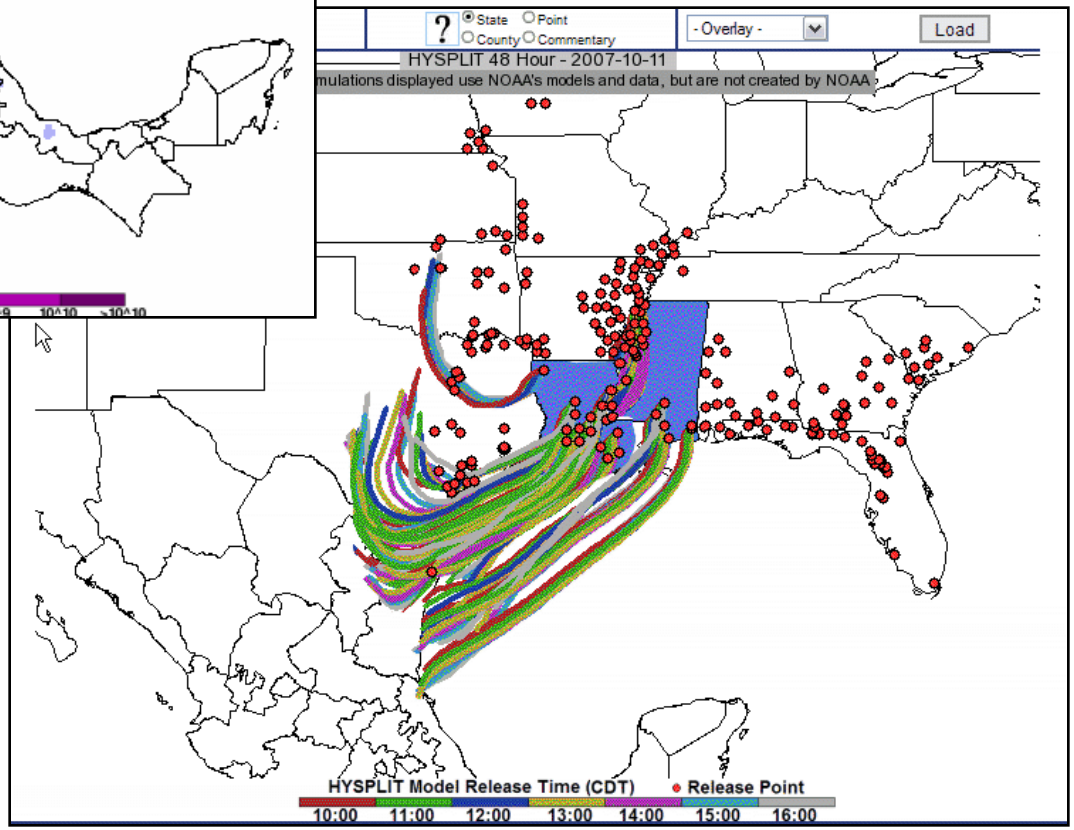
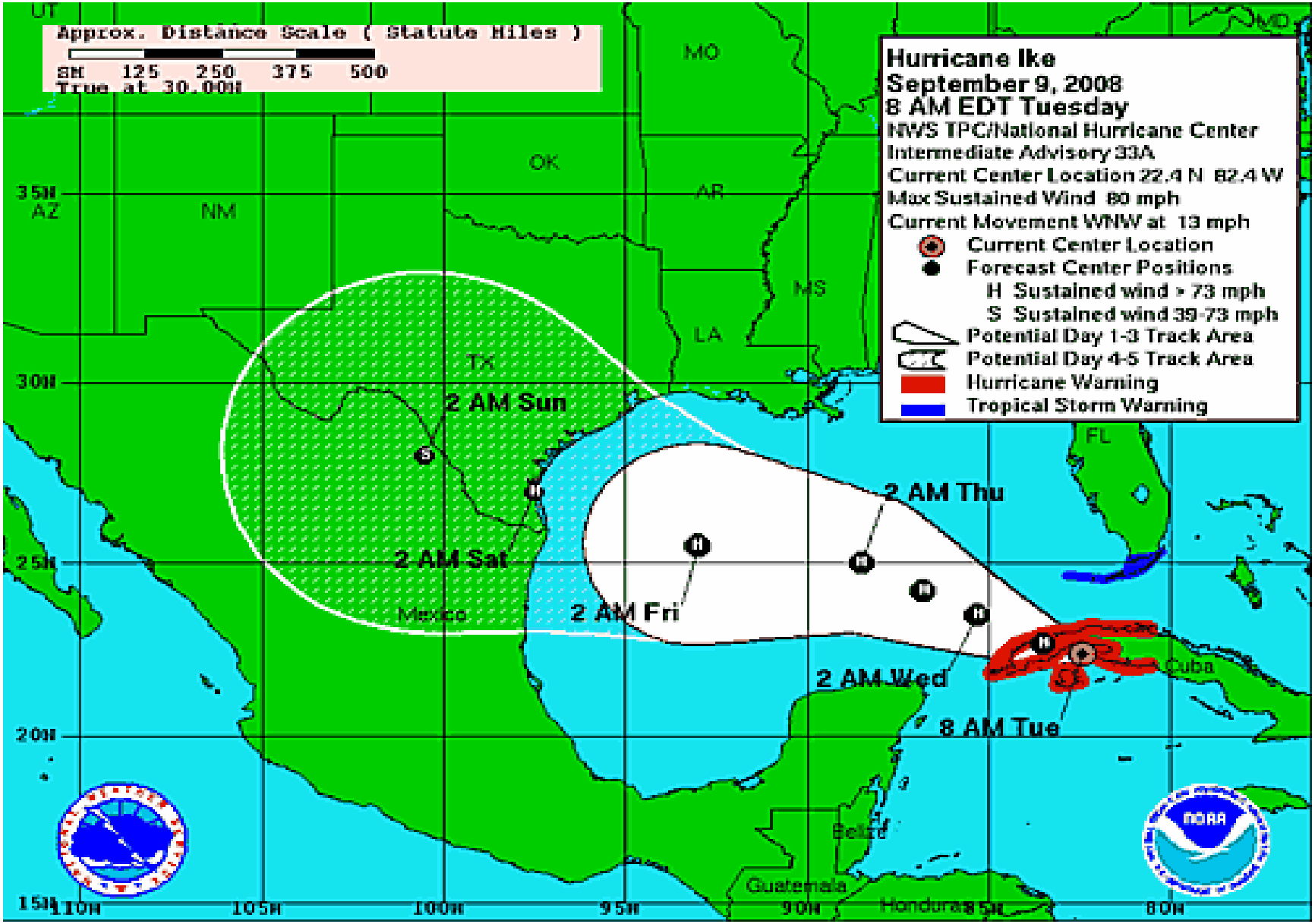


Figure 20. Posible Trayectoria de Huracan Ike



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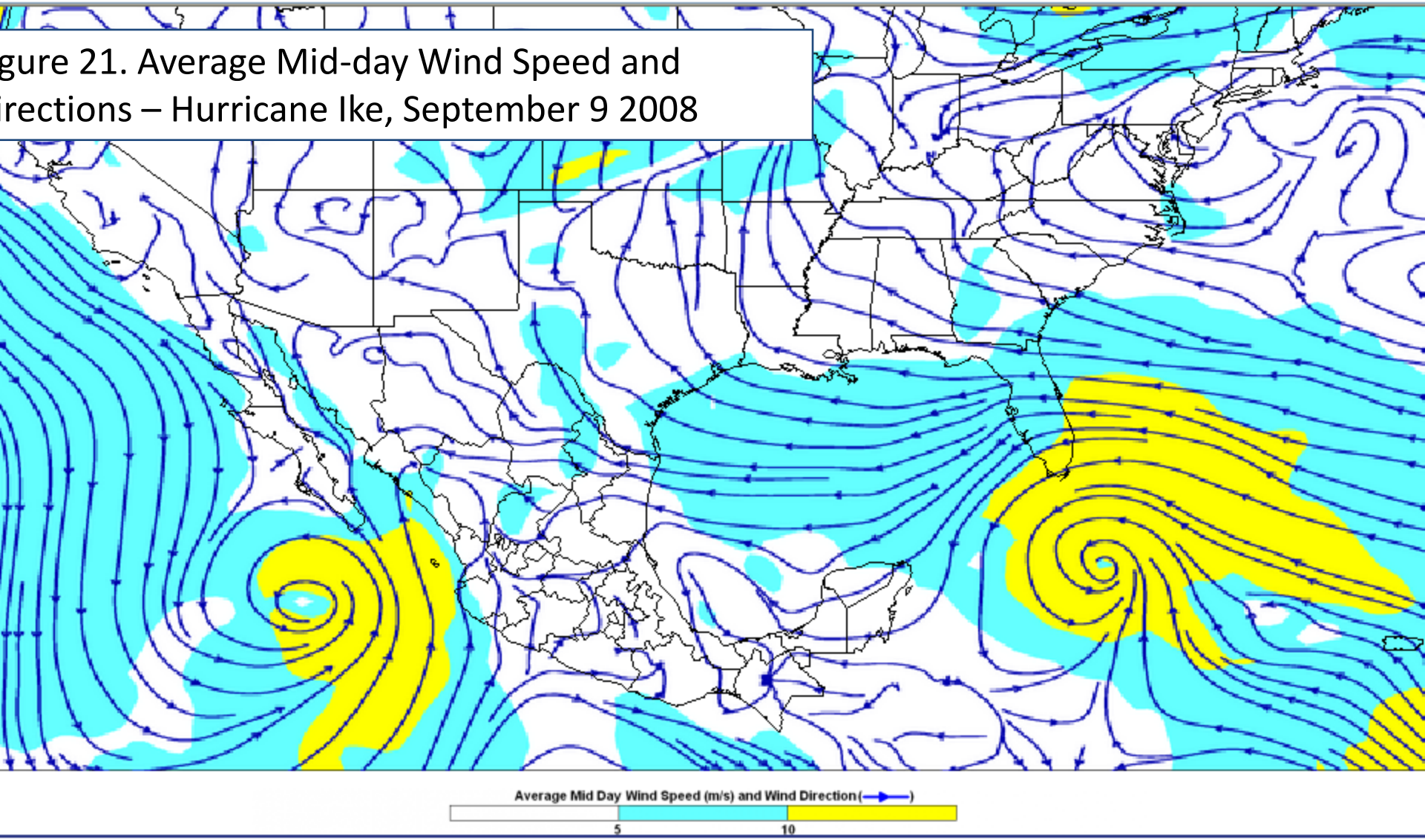
gure 21. Average Mid-day Wind Speed and
irections – Hurricane Ike, September 9 2008



Soybean Rust Research Forecast (issued: 2008-09-08)

ent Conditions

Current Conditions September 8th

High pressure situated over Appalachia is keeping most of the South dry this afternoon with the exception of some isolated thunderstorms, especially over the Florida Peninsula. Western and Central portions of Texas are currently observing heavy rain and strong storms associated with a cold front over the central U.S.

Risk Area: Spore transport, deposition, and survival are all currently notable throughout the state of Texas as the disturbance moves though, putting them at risk for the spread of the

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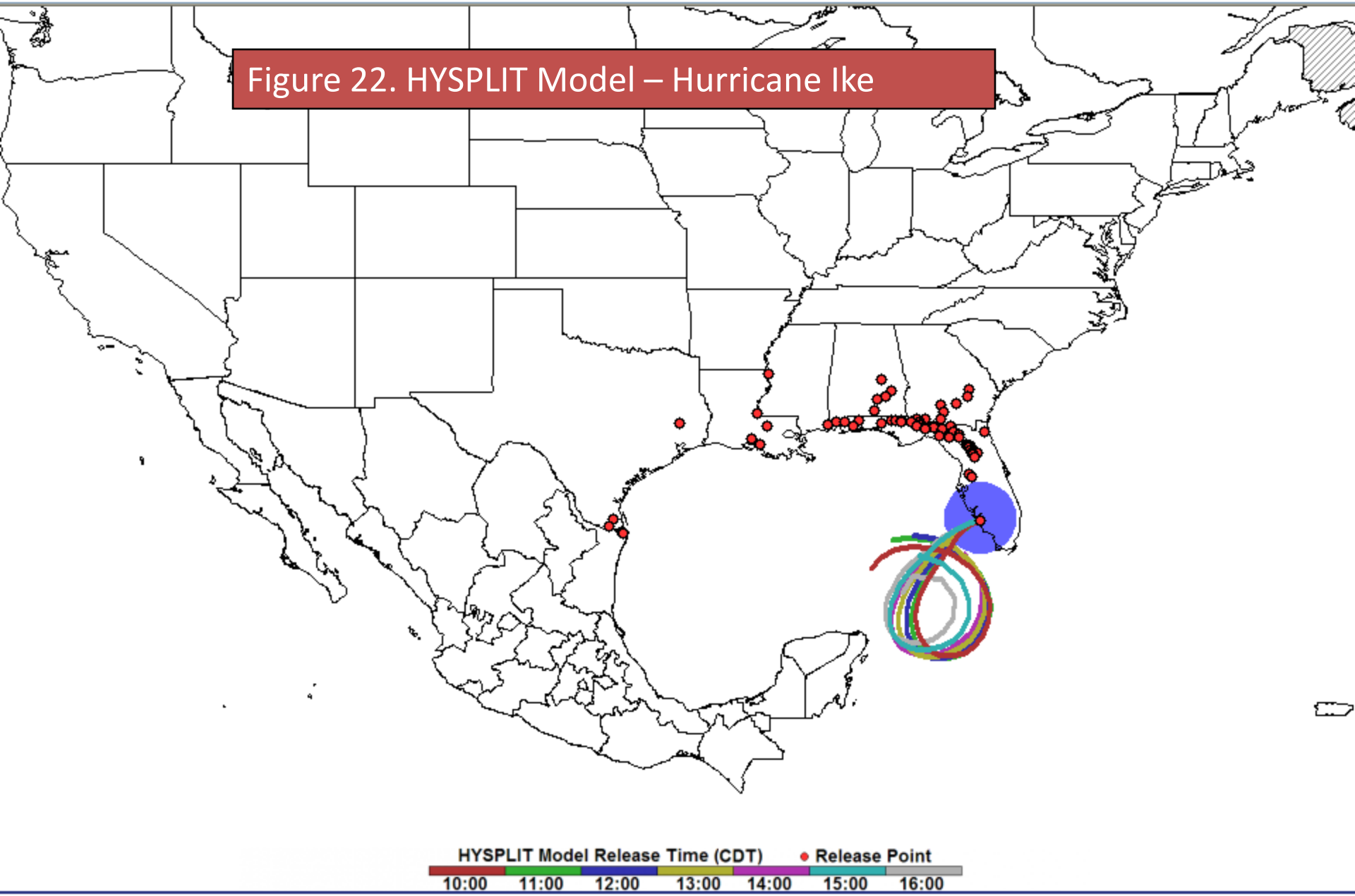
Figure 22. HYSPLIT Model – Hurricane Ike



United States Soybean Rust Commentary (updated: 09/08/08)

September, soybean rust was reported from Holmes County, Florida and from Ashley County, Arkansas on soybeans. Rust was also reported once again in Liberty County, Texas o
dzu. On 6 September, soybean rust was reported in Issaquena County, Mississippi. On 5 September, soybean rust was reported in Elmore (soybean) and Bullock and Pike counties
(kudzu) in Alabama, and in Coffee and Toombs Counties in Georgia.

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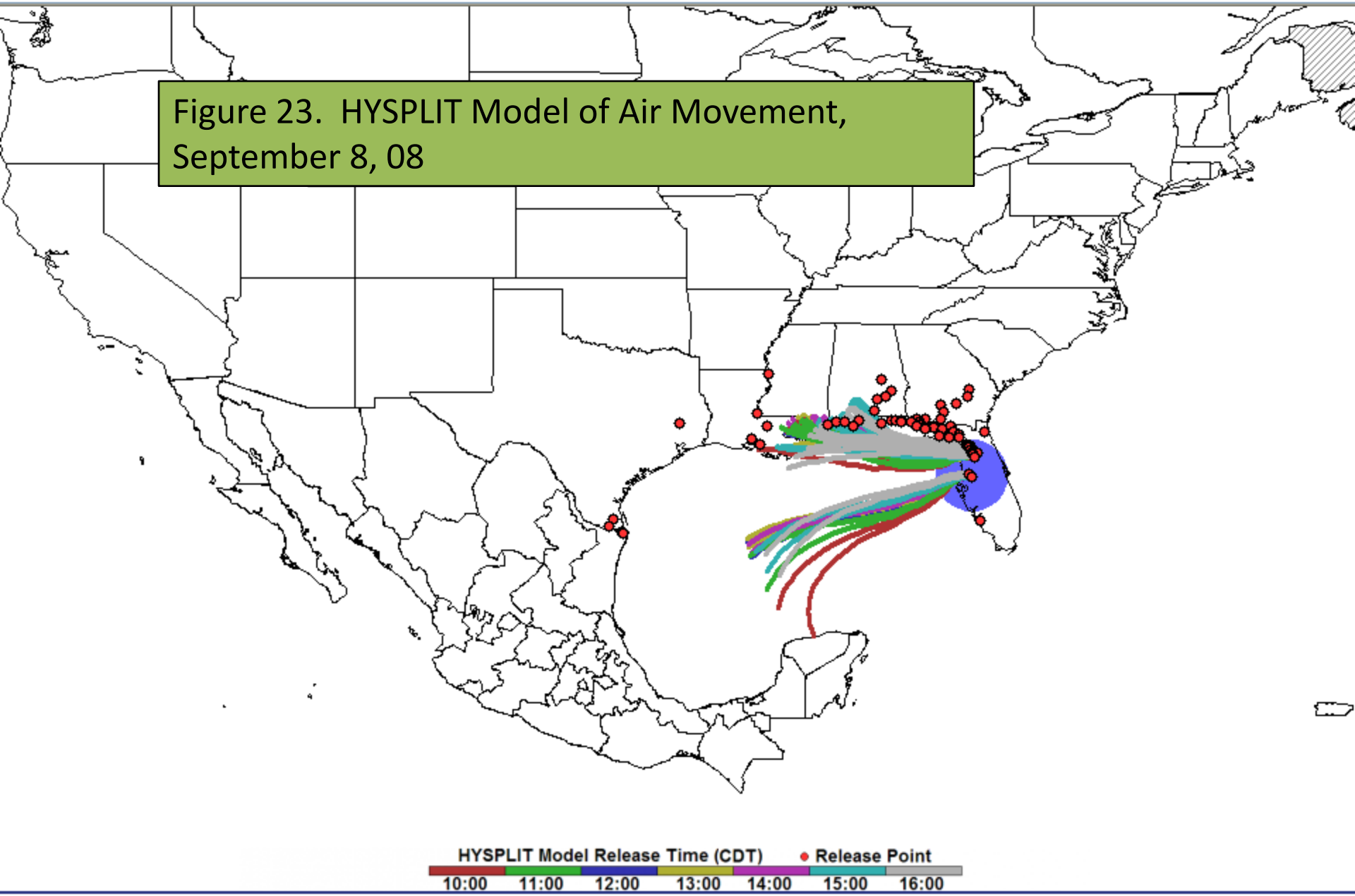
Figure 23. HYSPLIT Model of Air Movement, September 8, 08



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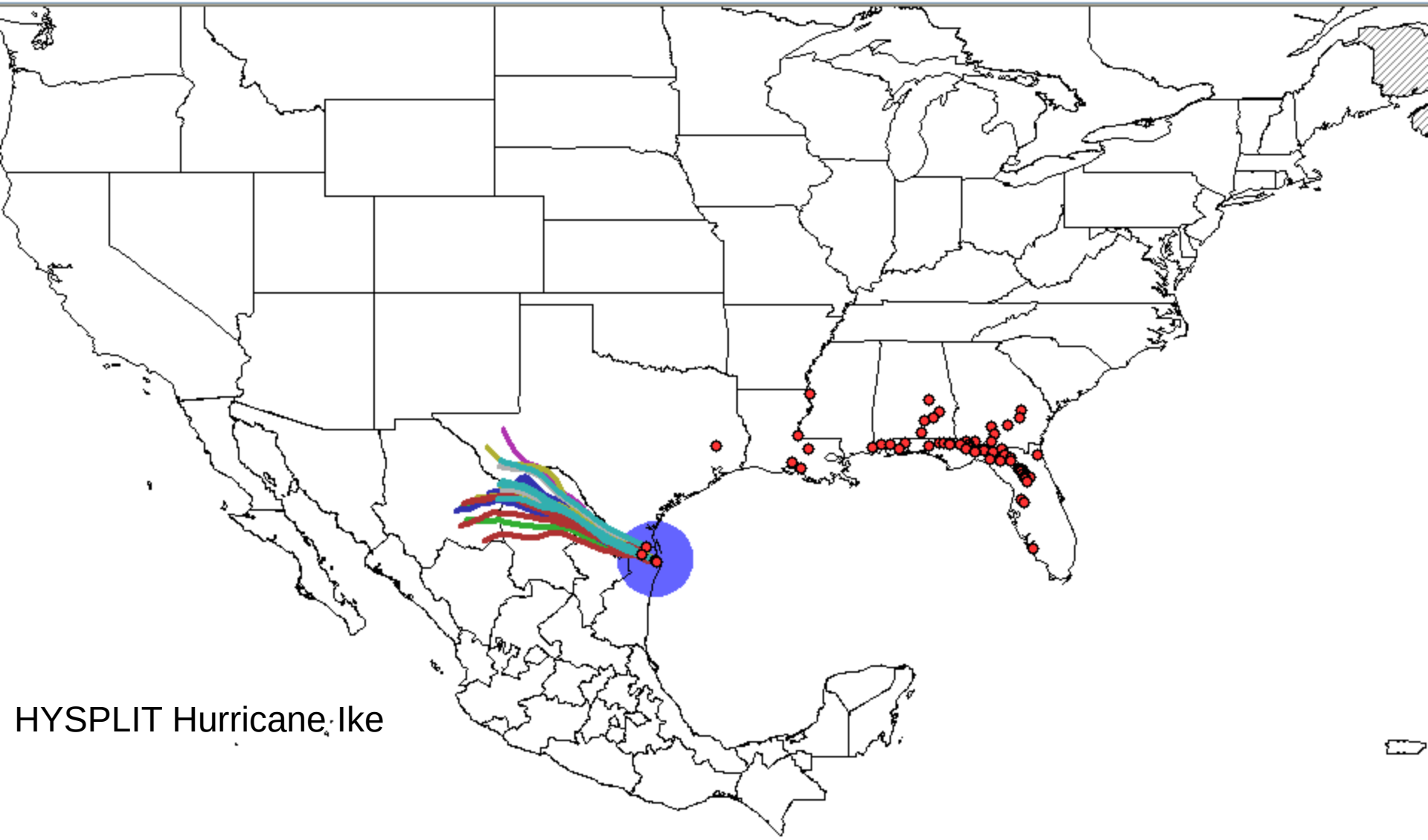

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Figure 24. HYSPLIT Model of Post-Impact Air Movement

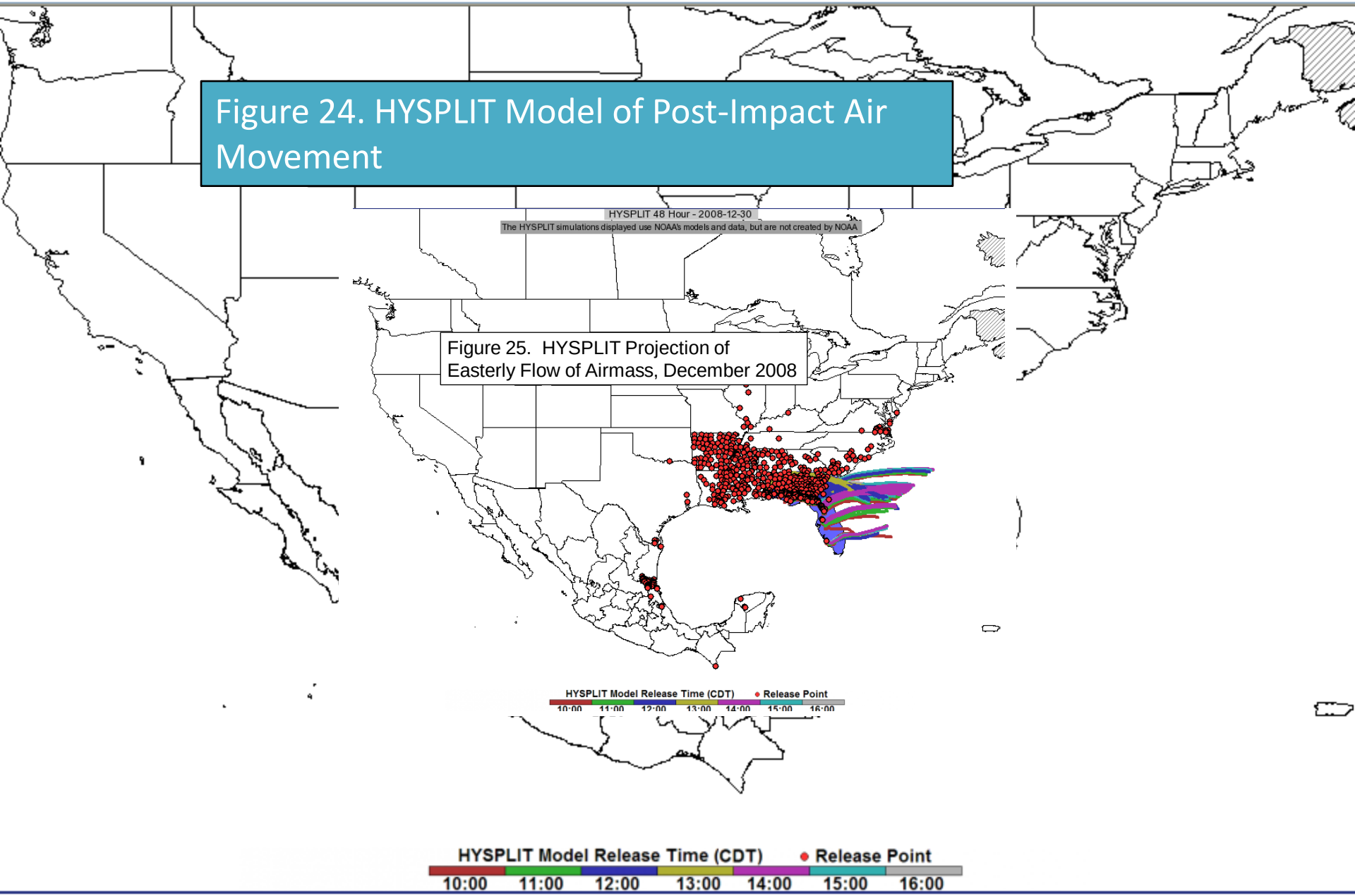

Figure 25. HYSPLIT Projection of Easterly Flow of Airmass, December 2008

United States Soybean Rust Commentary (updated: 09/08/08)

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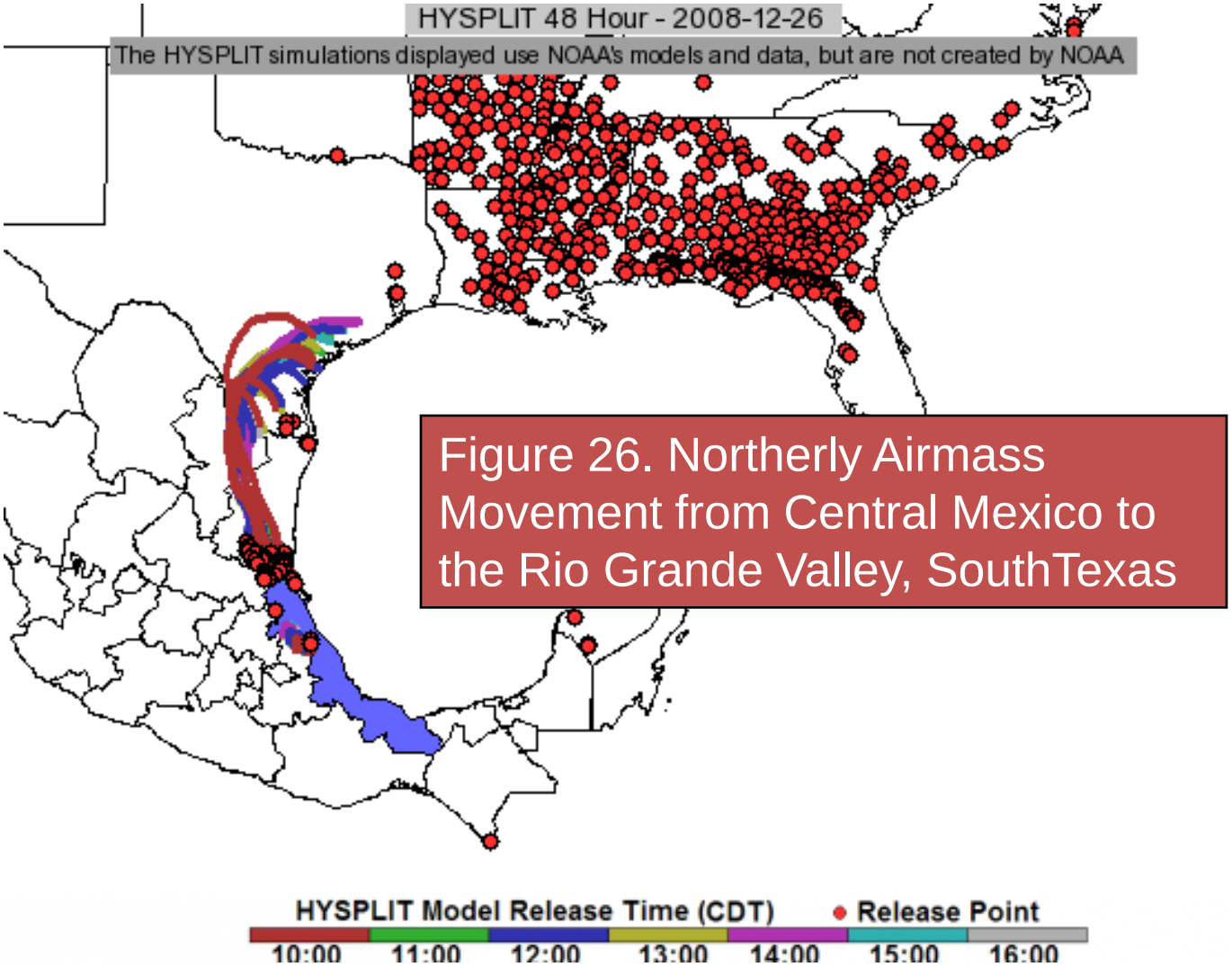
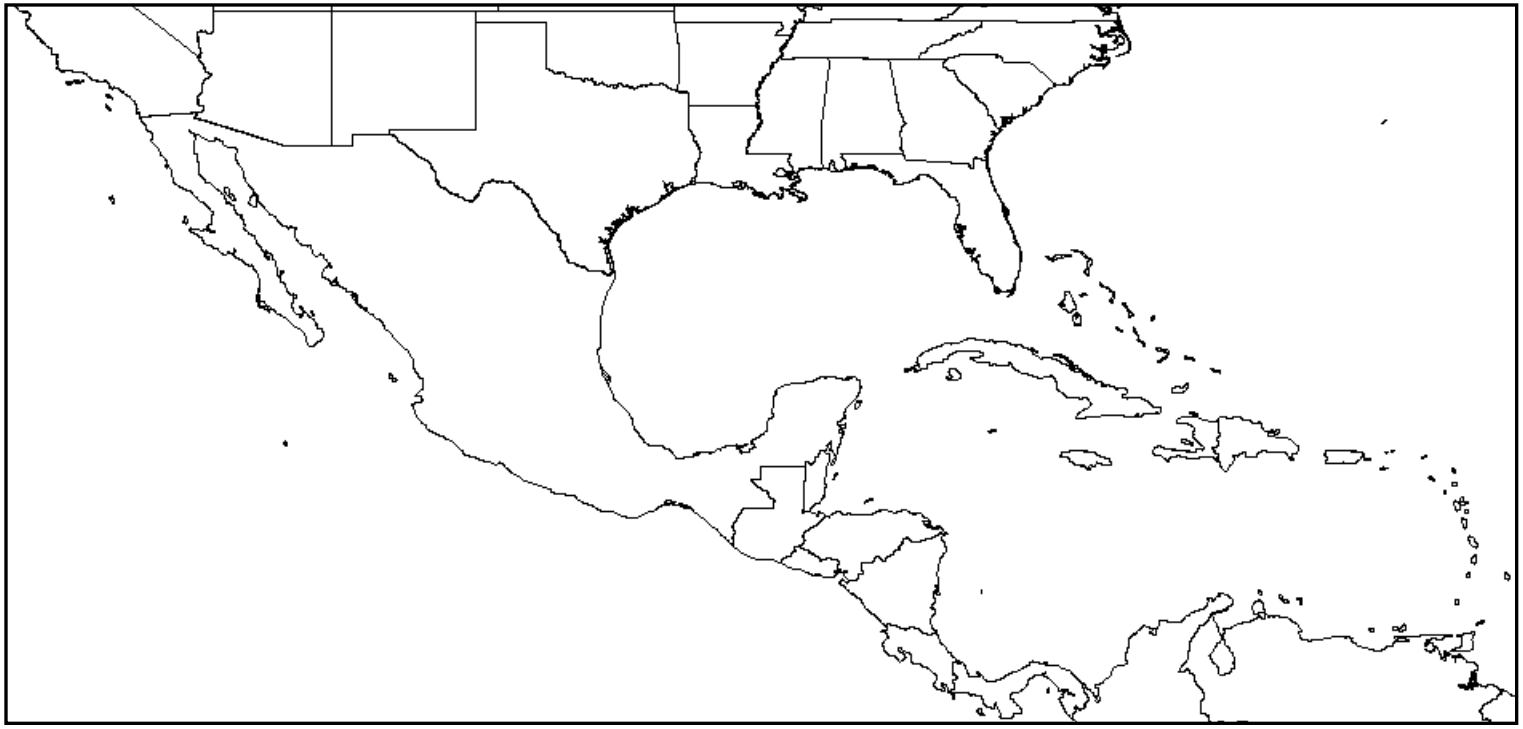


Figure 26. Northerly Airmass Movement from Central Mexico to the Rio Grande Valley, SouthTexas

Figure 27. Meso-American Scale Coordination in Control of Citrus Pests and Diseases Is Called For!



Recommendations

- Build and strengthen the framework for regional collaboration, from the Caribbean to Mexico and the United States.
- Identify and prepare more laboratories
- Adopt field protocols for uniform monitoring
- Adopt or create a common information platform for monitoring and managing vectors

Conclusions

- Successful management of citrus pests and diseases will require comprehensive, pan-regional tool sets and coordination
- A network of laboratories is already in preparation
- A network of field detectors, using agreed upon protocols is needed
- An information platform with risk analysis tools is available in PIPE or SCOPE
- Anything less that a pan-regional solution for the problems of the citrus industry, is likely to fail.

Preguntas?/Questions?