Application of Climate Information to Risk Management in Agriculture

C. W. Fraisse and SECC Extension

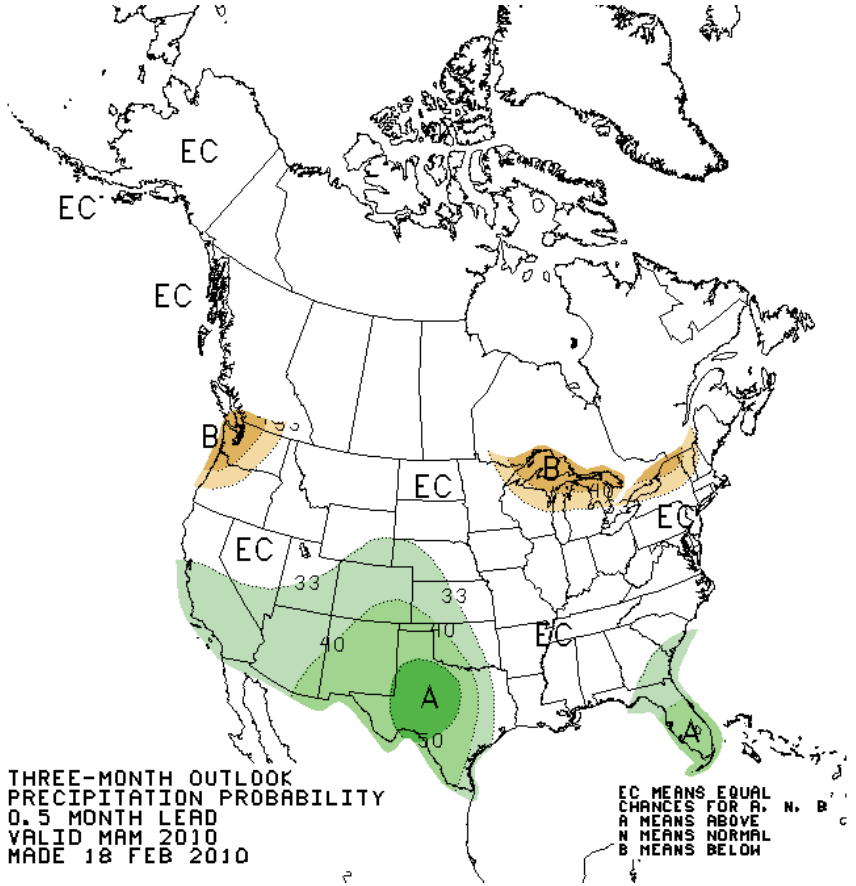
Climate Prediction Applications Science Workshop

San Diego, CA

March 2-4, 2010

Vision for a Climate Extension Program

- Agricultural, forestry, and water resource managers will better cope with uncertainty and climate associated risks through routine and effective use of climate forecasts and climate-related decision support tools.



The task requires going well beyond simply producing good climate forecasts. For climate information to benefit society, it must fit into a **decision making process** and must affect actions of decision-makers

Decision Making in Agriculture

Independently of how technically sophisticated a farmer is, there is always a need to make decisions before, during, and after the cropping season. We need the seamless suite of forecast products discussed yesterday!

Weather: Short-term Forecast

Tactical, within-season decisions are based on weather monitoring and short-term forecast

- Planting
- Irrigation decisions (when and how much)
- Application of fertilizers
- Application of pesticides
- Harvesting
- Hay cutting

Seasonal Forecast

Pre-season, strategic decision-making process can be improved by considering seasonal forecasting

- Crop variety selection
- Acreage allocation
- Crop insurance coverage
- Marketing
- Purchase of inputs
- Purchase of hay/feed by livestock producers
- Preparedness for extreme events

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Current Climate Phase: El Niño

El Niño reaches moderate strength and continues to build in the Pacific Ocean.

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News

El Niño's impact on South's weather - (Feb. 16, 2010)

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More News »

Outlooks

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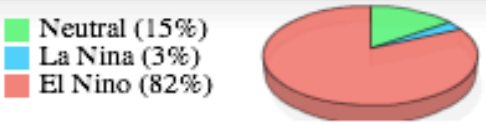
SECC Agricultural Outlook (Oct. 30, 2009): El Niño May Bring a Wetter Winter and Spring to the Southeast

Outlook Archive »

Climate Phase Forecast for Mar-Apr-May



Source: The International Research Institute for Climate and Society

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AgroClimate Workshop - Griffin Georgia
February 13, 2008

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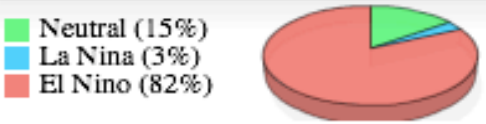

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AgroClimate Outlooks

Climate Outlook

El Niño in charge in the Pacific Ocean

November 13, 2009

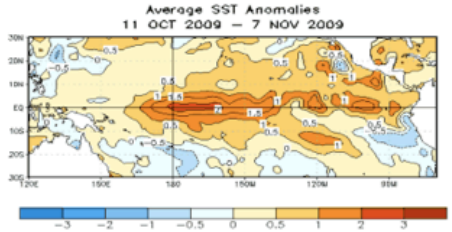
SECC Winter Climate Outlook

Date updated: November 13, 2009

DOWNLOAD PDF

El Niño in charge in the Pacific Ocean

The Pacific Ocean is firmly entrenched in the El Niño Phase. Ocean temperatures over the past few months have continued to warm in the eastern and central tropical Pacific Ocean and are now over 1.0 degree C warmer than normal over a large area. Sea surface temperatures in this region of 0.5 degree C warmer than normal are the commonly used threshold to designate El Niño conditions. El Niño refers to a periodic (every 2-7 years) warming of the tropical Pacific Ocean along the equator from the coast of South America to the central Pacific. Once surface temperatures warm to over 1.0 degrees C the El Niño is considered moderate in strength (the three classifications are weak, moderate, and strong). This warming began in May and has continued through the summer and fall months. The development of this El Niño follows the typical life cycle of building in the summer and fall months before reaching peak strength in mid winter.



Sea surface temperature departures from normal (degrees C) over The Pacific Ocean as of July 1 (courtesy NOAA).

Agricultural Outlook

El Niño may bring a wetter winter and spring to the Southeast

October 30, 2009

SECC Agricultural Outlook

Date updated: October 30, 2009

Prepared by Clyde Fraisse and Brenda Ortiz

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El Niño May Bring a Wetter Winter and Spring to the Southeast

Conditions across the equatorial Pacific Ocean started shifting from neutral to El Niño last June and now have warmed to weak El Niño levels. During the Nov-Jan season, there is 90% probability of maintaining at least weak El Niño conditions, and a only a small chance (9%) of returning to ENSO-neutral conditions. El Niño could have dramatic impacts on the climate of the Southeast for the remainder of 2009 and early 2010. El Nino in the winter causes the jet stream current to dip into the Southeast. This provides cold fronts with more moisture and energy. El Nino typically leads to 40 to 50% more rainfall than normal for the Florida peninsula, and about 30% more than normal for South Georgia.

Winter vegetables such as tomato and green peppers generally yield less during El Niño years than during Neutral or La Niña years. Most soil-borne pathogens and fruit quality problems increase in El Niño years. Fruit quality problems like gray wall and bacterial and fungal diseases that are typically associated with wet climates can be more prevalent during El Niño winters. More information about potential impacts of El Niño on winter vegetables can be found on the following EDIS publication: http://edis.ifas.ufl.edu/AE269

Nutrient management can also be affected by a wetter winter and spring as the frequency of leaching rainfall events increases, causing nutrients, mainly Nitrogen, to be washed out of the root zone, especially in fields irrigated by seepage irrigation. Recent studies demonstrated that during El Niño years, at least one leaching rainfall event of 1.0 inch or more in 1 day occurred in most locations where winter vegetables are grown in Florida and two of these events occurred in 9 out of 10 years.

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House tackles climate change, ag offsets - (Dec 21, 2009)

Alabama farmers get irrigation grants - (Oct. 30th, 2009)

NOAA: El Niño to Help Steer U.S. Winter Weather - (Oct. 15, 2009)

Soggy September floods north Georgia - (Oct. 1, 2009)

More News »

Outlooks

Monthly Climate Summaries (Feb. 8, 2010): for Florida, Georgia and North Carolina now available

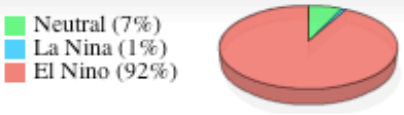
SECC Winter Climate Outlook (November, 14 2009): El Niño in charge in the Pacific Ocean.

New Climate Phase Forecast (November, 14 2009): El Niño reaches moderate strength and continues to build in the Pacific Ocean.

SECC Agricultural Outlook (October 30, 2009): El Niño May Bring a Wetter Winter...

Outlook Archive »

Climate Phase Forecast for Feb-Mar-Apr



Source: The International Research Institute for Climate and Society

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AgroClimate and FAWN booth, Small Farms Trade Show, Orlando, Florida - August 2009

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- Climate
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  - Freeze Risk Maps
  - Cooling/Heating Degree Days
- Drought
  - Keetch-Byram Drought Index
  - Lawn & Garden Index
  - ARID Drought Index
- Carbon Tools
  - Footprint Calculator
- Crop Yield
  - County Yield Database
  - Yield Risk Simulator
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  - Growing Degree Days
  - Chill Accumulation
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  - Strawberry Disease Forecasting
  - Tomato Spot Wilt Virus Forecasting

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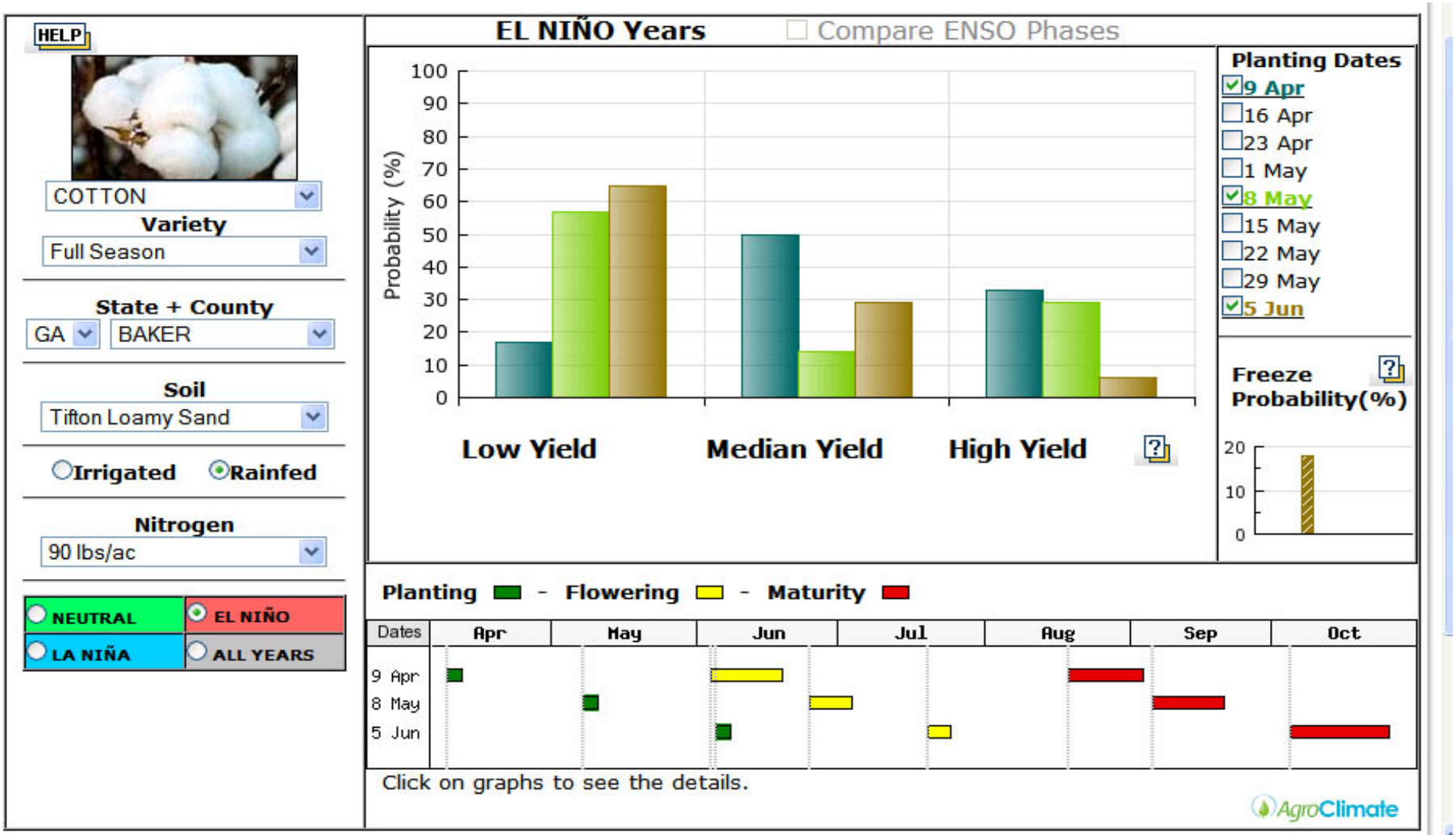
Yield Risk: Pre-season tool



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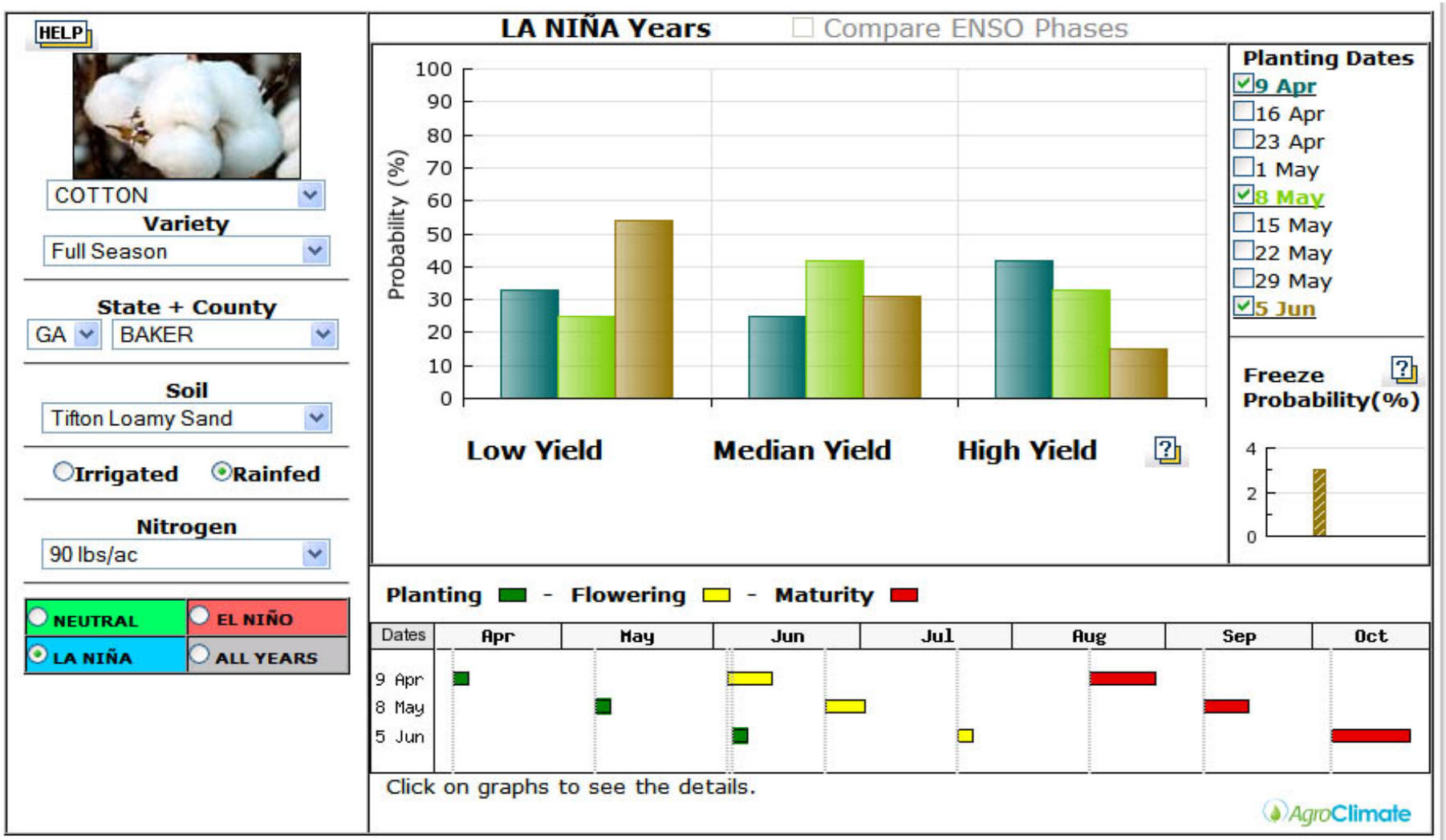

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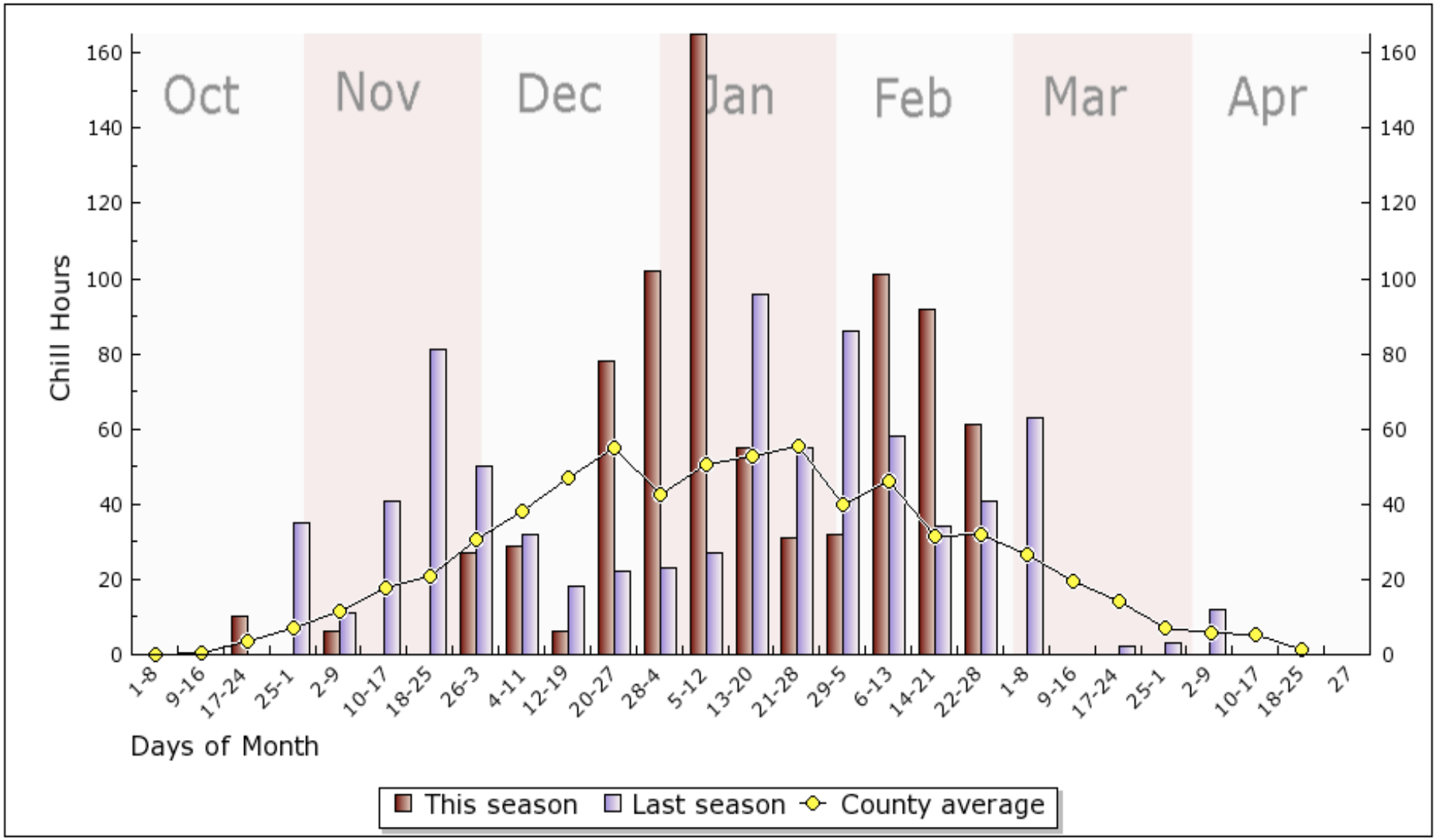
Chill Accumulation: Pre and in-season tool



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Current Climate Phase: Neutral
A transition from La Nina to neutral conditions occurred during June 2008.

Strawberry Disease Tool

« Back to Tools

Select the station/county:

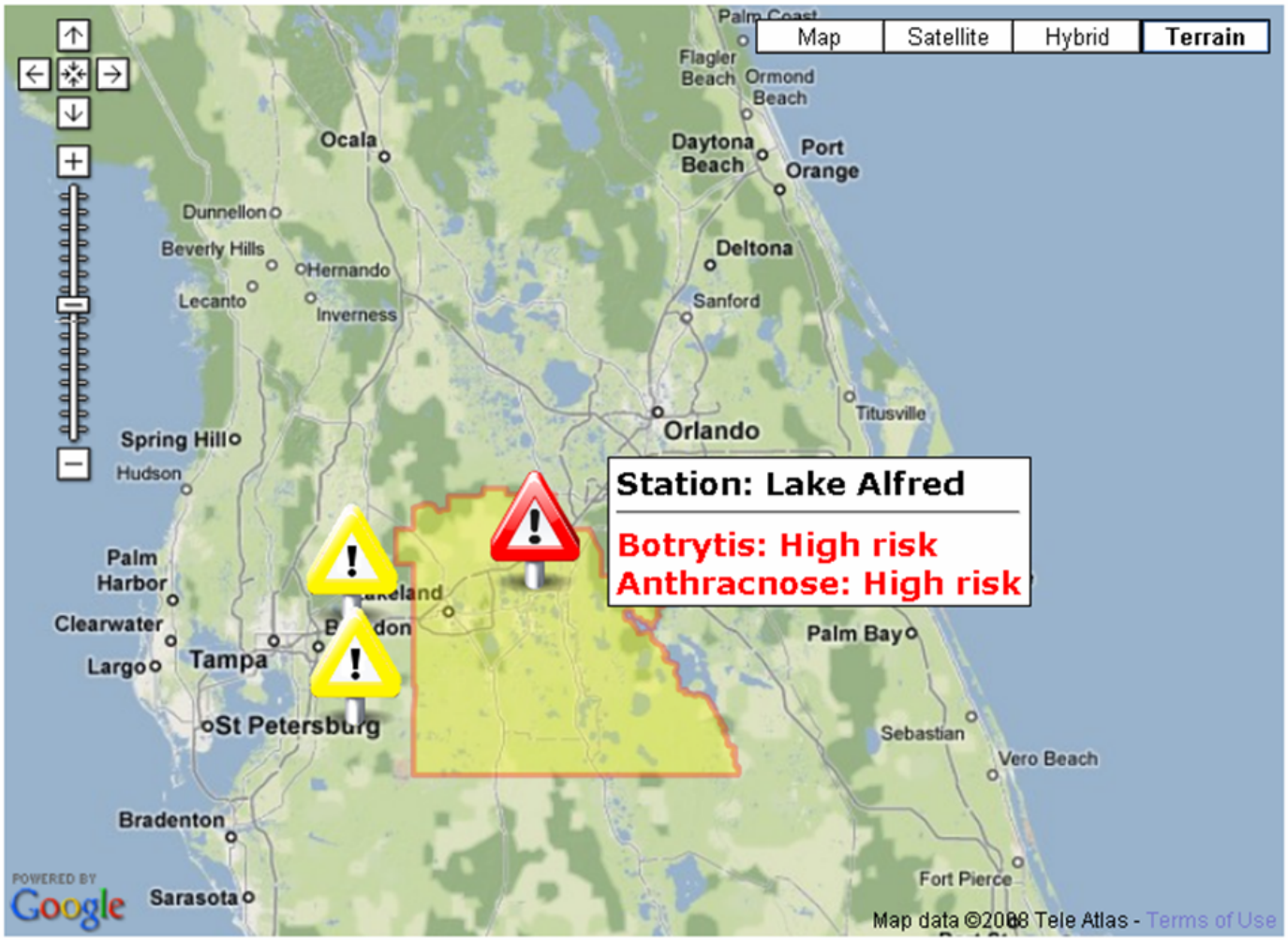
Lake Alfred/Polk

Clean the limits of County

News: **2008-11-04 11:30:29**
Controlling Powdery Mildew on Strawberry

Powdery mildew, caused by the fungus Podosphaera macularis, is one of the first diseases that appear after strawberries are planted. It is also the first disease that requires adding additional fungicides to the spray tank. Powdery mildew is a sporadic problem that is damaging some seasons, but not others. Disease severity depends on three main factors...
» more detail.

Can't you see the map?
Use Firefox Browser



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Current Climate Phase: El Niño
The Pacific Ocean is currently transitioning into the El Niño phase.

Strawberry Disease Tool

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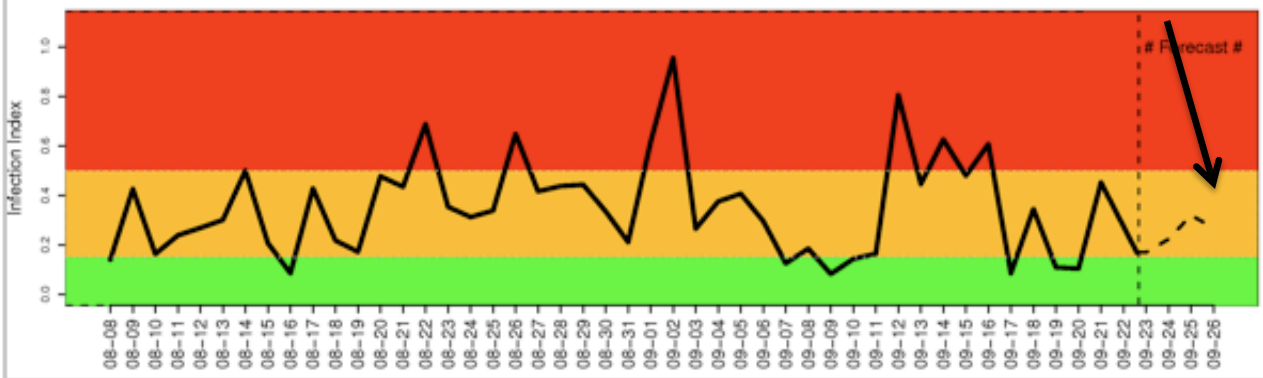
Balm Station

Recommendations | Disease Simulation | Weather | Contact

Botrytis | » Anthracnose

Anthracnose Simulation Output

High risk | **Moderate risk** | **No risk**
(Click on the graph to expand it)



Date	LWD	Temp (F)	Temp (C)	Infection Index	Description
2009-09-25	10.00	75.53	24.19	0.2694	Moderate risk
2009-09-24	11.00	75.06	23.92	0.3193	Moderate risk
2009-09-23	9.00	76.00	24.44	0.2233	Moderate risk

National Digital Forecast Database

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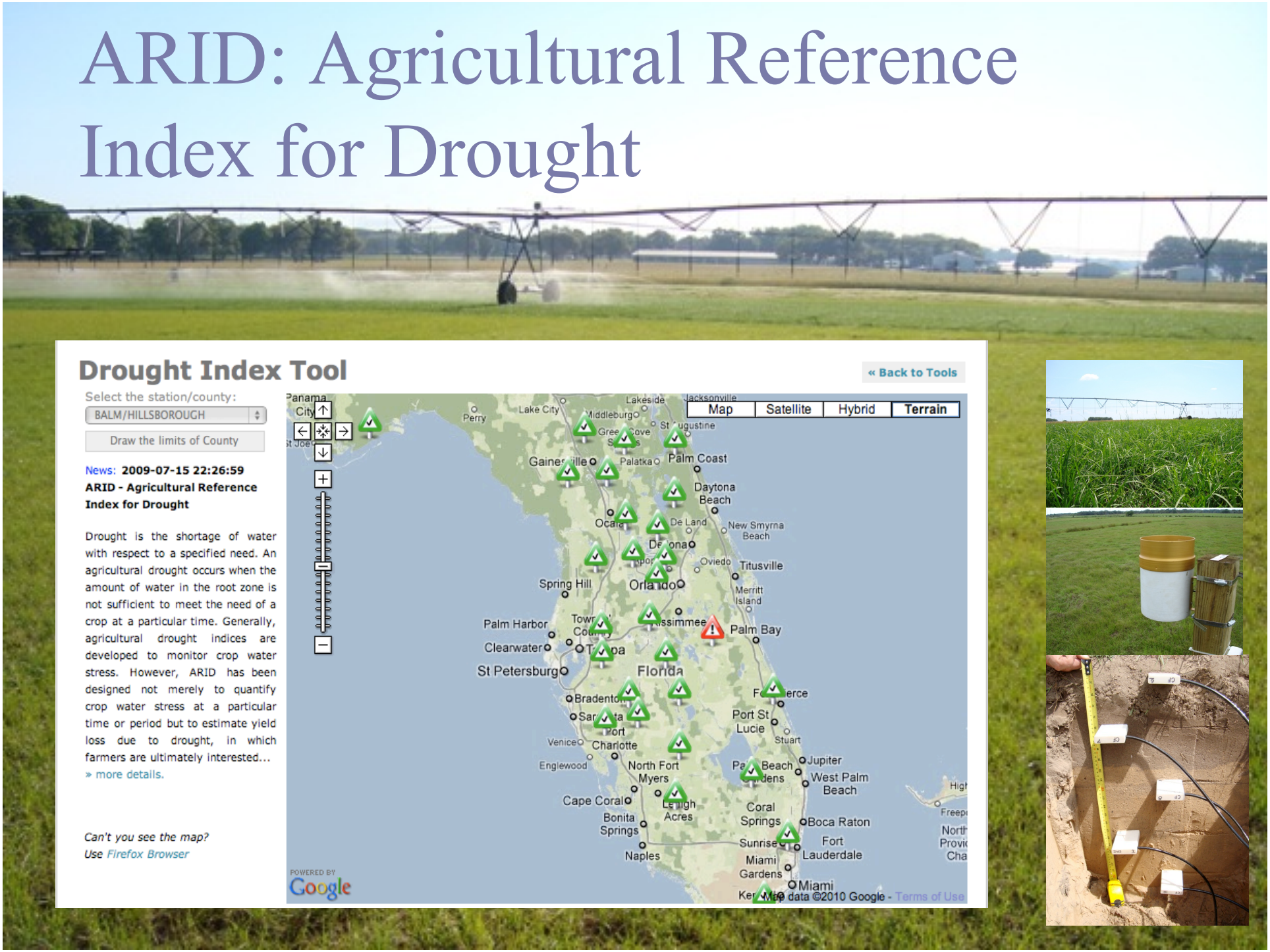
ARID: Agricultural Reference Index for Drought



Drought Index Tool

« Back to Tools

Select the station/county:

BALM/HILLSBOROUGH

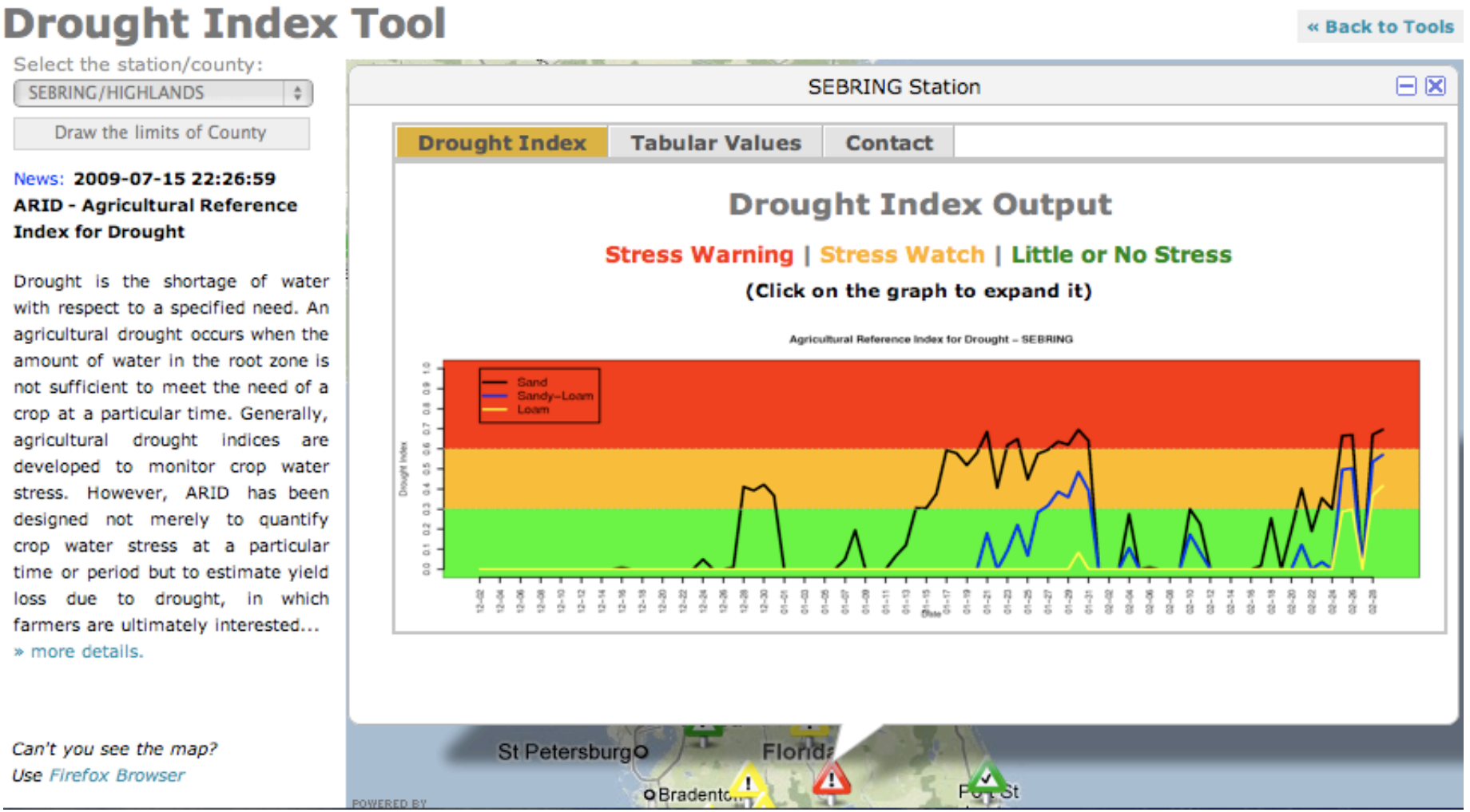
Draw the limits of County

News: **2009-07-15 22:26:59**
ARID - Agricultural Reference Index for Drought

Drought is the shortage of water with respect to a specified need. An agricultural drought occurs when the amount of water in the root zone is not sufficient to meet the need of a crop at a particular time. Generally, agricultural drought indices are developed to monitor crop water stress. However, ARID has been designed not merely to quantify crop water stress at a particular time or period but to estimate yield loss due to drought, in which farmers are ultimately interested...
» more details.

Can't you see the map?
Use Firefox Browser

ARID: Agricultural Reference Index for Drought



ARID: Agricultural Reference Index for Drought

Drought Stage	Characteristics	Tactical decision
Early	▪ Daily evapotranspiration has exceeded precipitation for several days ▪ Forage growth has begun to slow ▪ Blades of grass curl during the mid-day heat and the swards begin to have more of a blue-gray tint rather than the bright green color of non-stressed stands	▪ Lower the stocking rate on each pasture ▪ Investigate the prices of supplemental feedstocks ▪ Maintain cows in a body condition score of at least five
Advanced	▪ Daily evapotranspiration has exceeded precipitation for several days ▪ Blades of grass remain curled throughout the day and the blue-gray tint of the sward is peppered with tan-colored leaf tips and new growth that has withered at the soil surface	▪ Maintain a stubble height of 2' of bermudagrass, 1½' of bahiagrass, and 2½-3' of tall fescue ▪ Limit the grazing pressure on current pasture supplies by allowing animals to access hay or creep rations containing soybean hulls, corn gluten, cottonseed, or other such supplements
Severe or extreme	▪ Daily evapotranspiration has exceeded precipitation for several weeks ▪ Forage growth has stopped and most, if not all, grazed pastures are down to the minimal stubble height. ▪ Remaining blades of grass stay tightly curled throughout the day and are almost completely tan-colored and withered	▪ Continue to confine sacrifice animals in paddocks and limit the access of grazing animals to current pasture supplies (if any) by allowing them to graze for brief periods during the morning or evening ▪ If the leaves and/or stems of warm-season grasses in the Sorghum family (sorghum, sudangrass, sorghum x sudan hybrids, and johnsongrass) are wilted and tan-colored, avoid feeding this forage as it may contain toxic levels of prussic acid.

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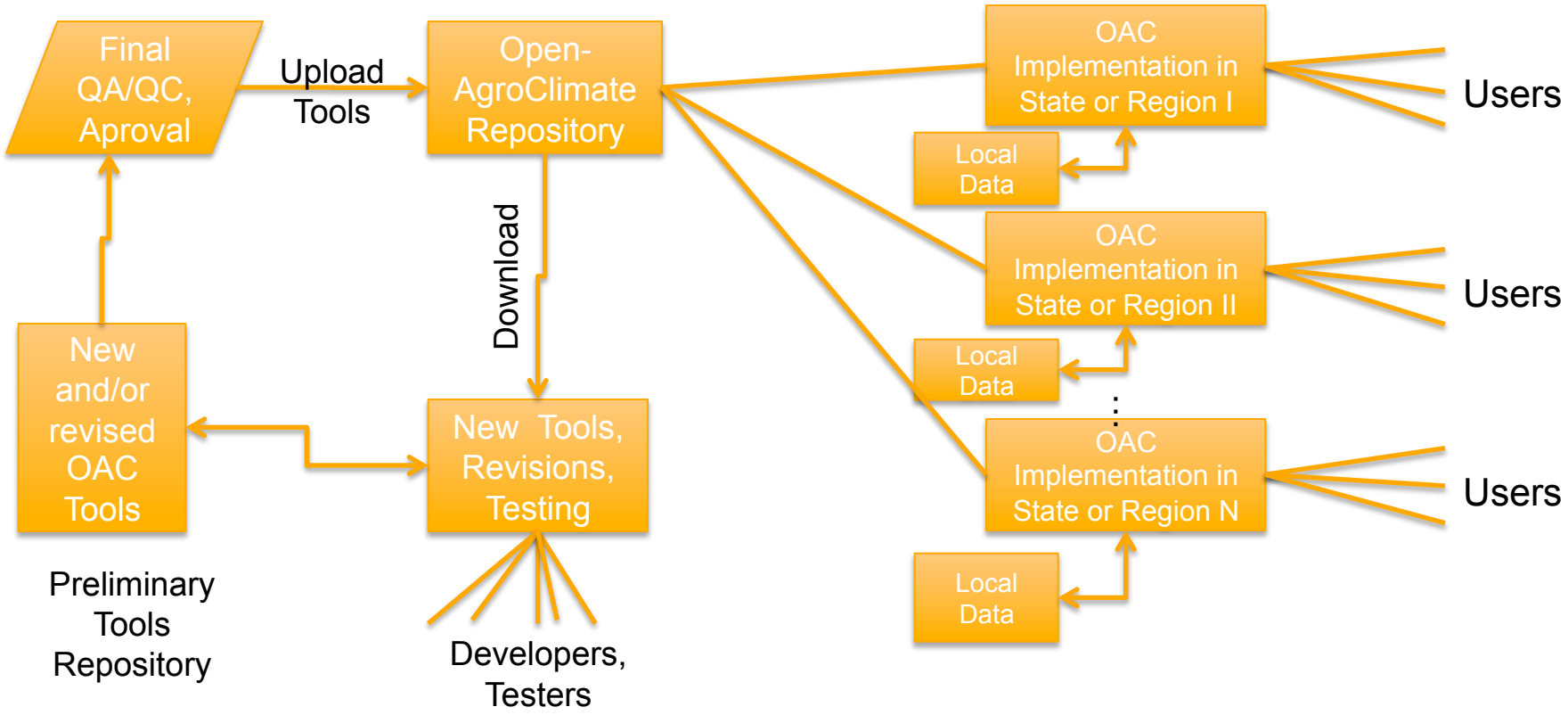

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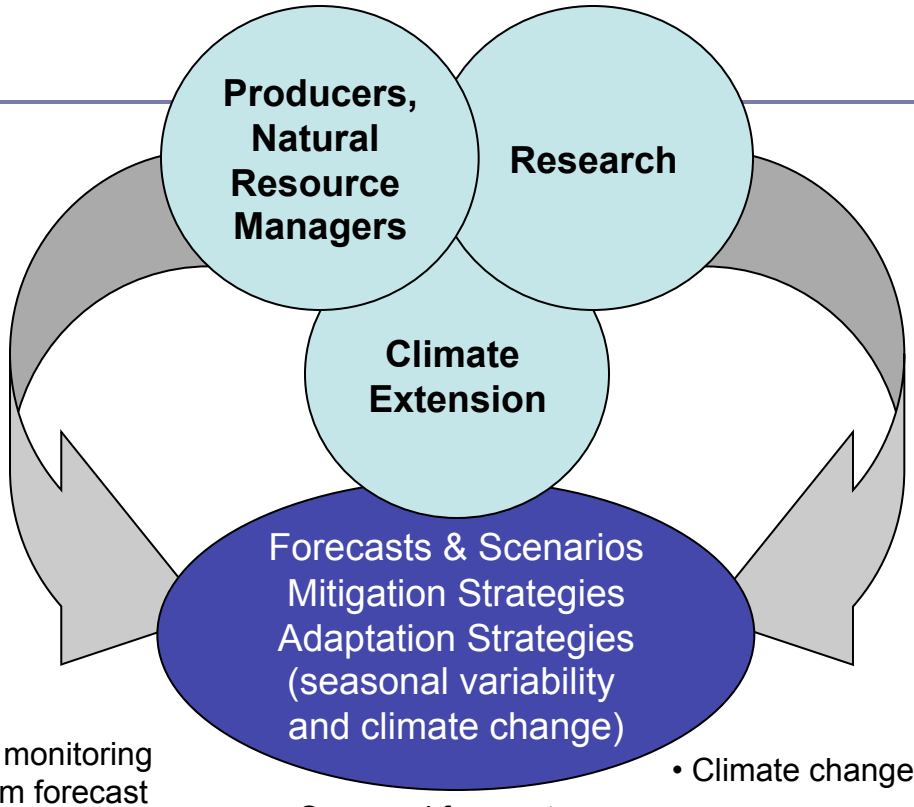
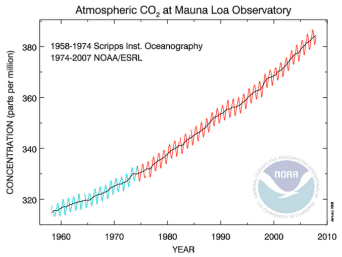




- Weather monitoring
- Short term forecast

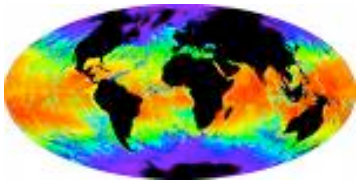
- Seasonal forecast

- Climate change scenarios

Scale of climate variability

One Cropping Season | Multiple Cropping Seasons | One to several generations

Weather Monitoring | Seasonal Climate Variability | Climate Change



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