MRCC Operational Freeze Guidance Products and Climatologies

Allan Curtis
March 2013

Midwestern Regional Climate Center

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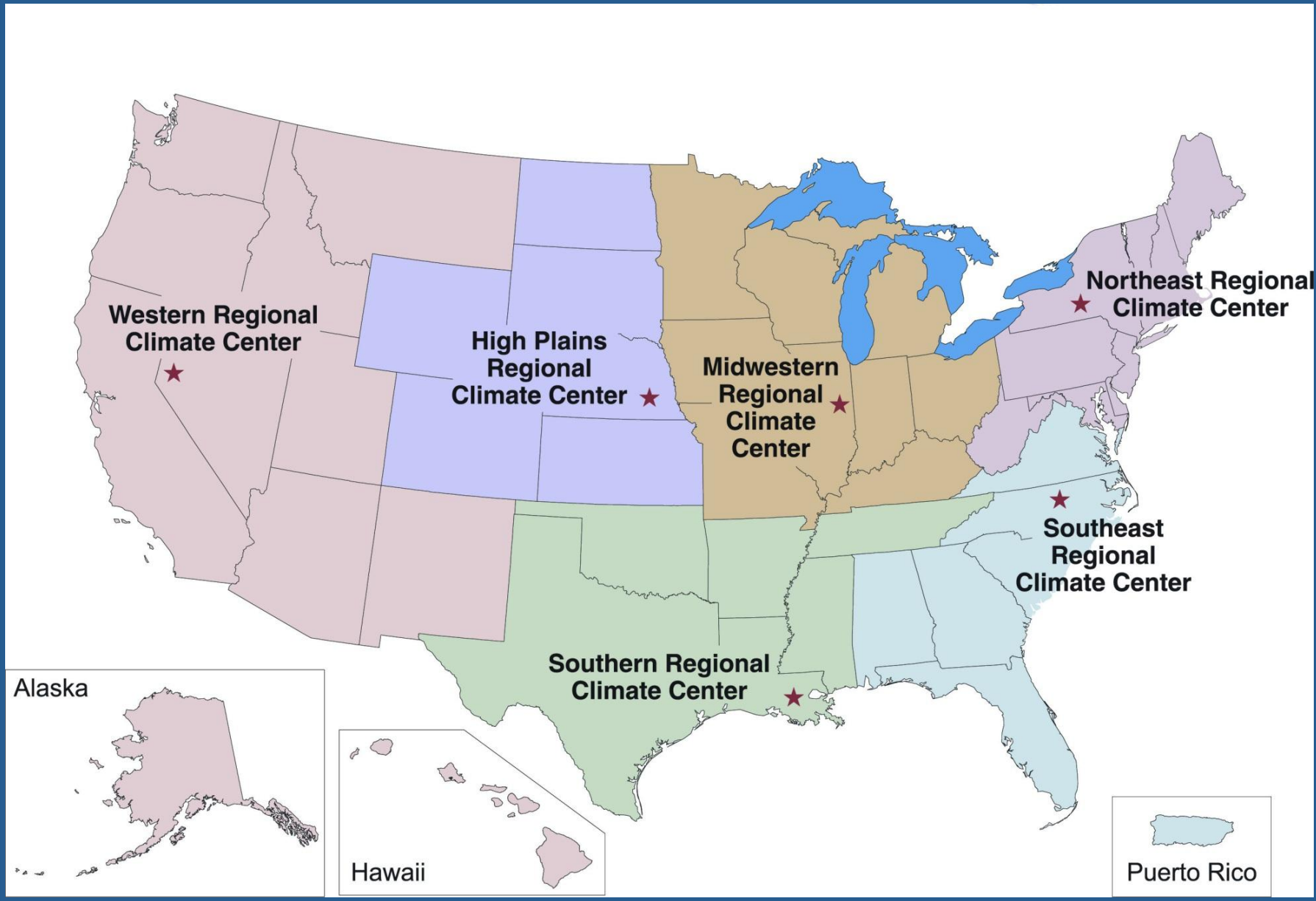
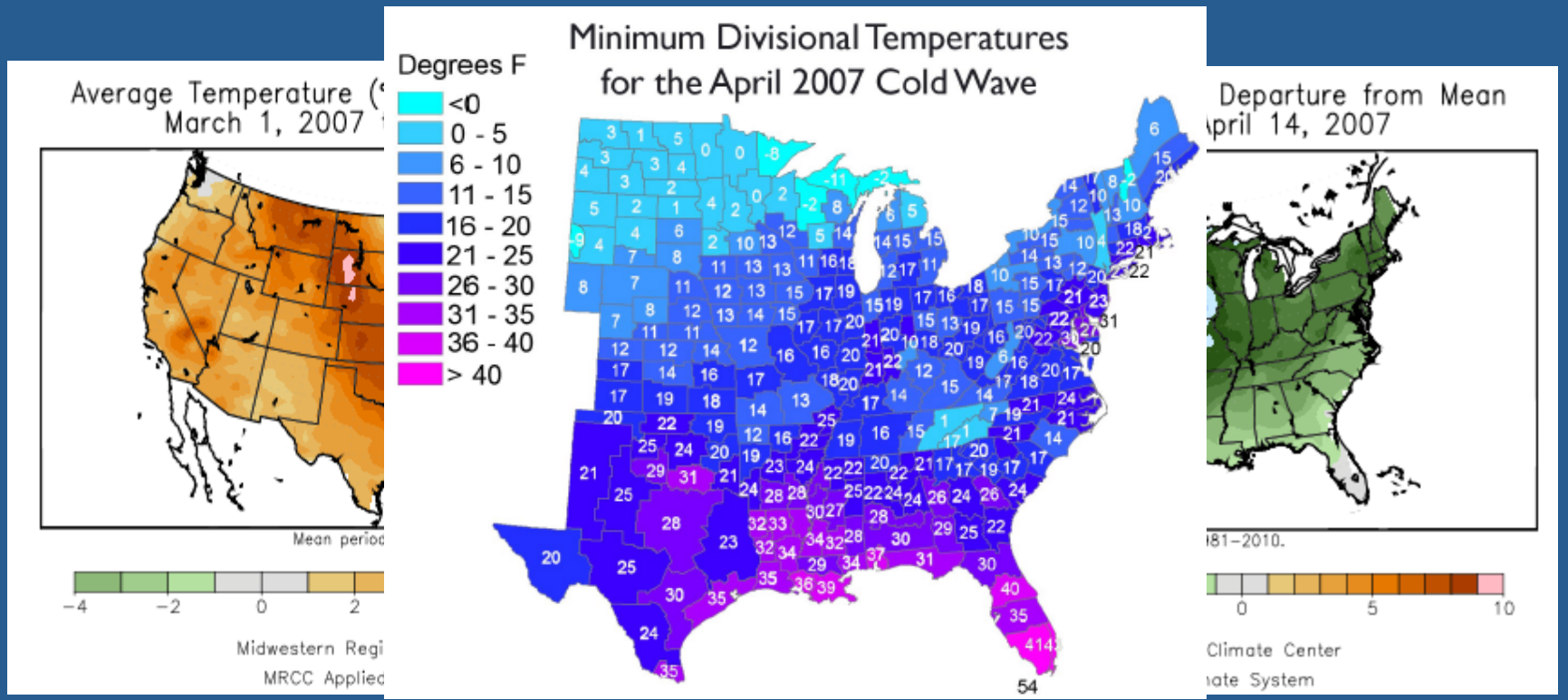


Why are Frost/Freeze data important?

- Climatological perspective
- Trends in recent dates
- Risk management – risk/reward
- Awareness of current conditions
  - Necessary preparations of a possible freeze

2007 Freeze

- $2 billion event across Midwest and Eastern US
- March 2-8°F above normal, catalyst for early growth
  - Followed by artic blast in early April



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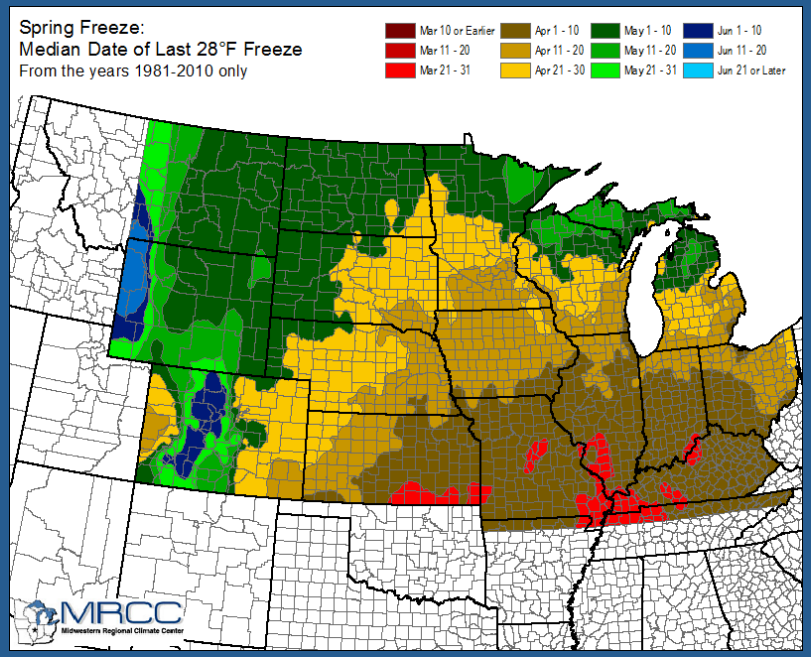
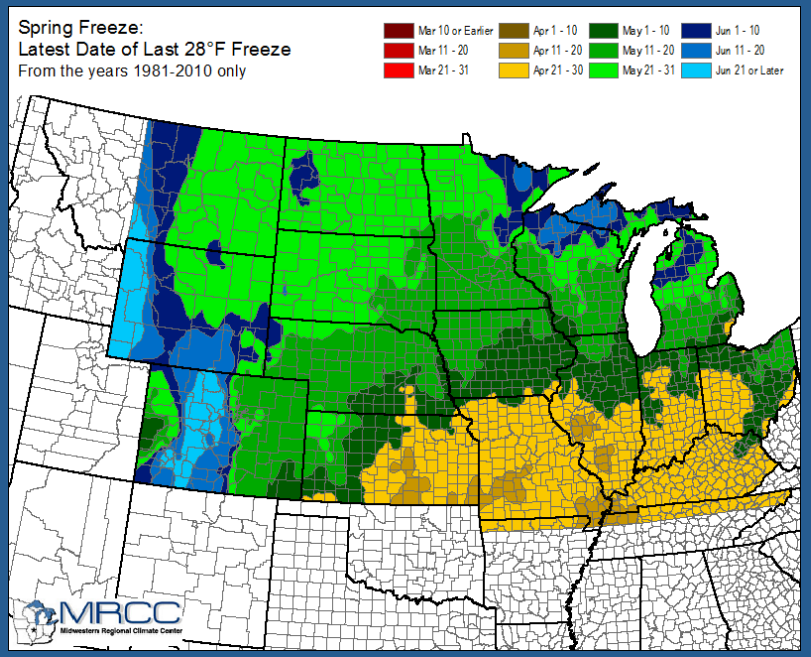
2007 Freeze

- Not necessarily a climatologically late freeze event for many, but it was in the southern states (not pictured below)
  - It was the timing coupled with the warm March that was the culprit





2007 Freeze

- What came out of this event and subsequent report?
  - NWS services and communication were good overall but…
    - It was recommended that changes could be made to improve
      - Base freeze warning on potential impacts to agriculture, horticulture, nurseries, and home gardens rather than calendar dates
      - Develop and utilize ties with University Extension, state climatologists, USDA personnel, and other relevant partners to:
        - » Determine when freezing temperatures are a threat and
        - » To gather quality, detailed post-event impact information for regional reports and even documentation (ie, storm reports, drought monitor)

Where does MRCC fit?

- Relationships already built with NCDC, NWS, SCs, University Extension, and more
  - A natural liaison between groups
- Strive to provide timely products and information to users
- Uniquely positioned overall

The End Goal

- A one-stop shop for Frost/Freeze products and forecasts
  - Daily Products
    - Many in production and operational or in beta phase
  - Incorporate hourly data (down the road)
    - Duration of freeze at an hourly time step
    - Chilling hours – dormancy for fruits
  - Incorporate hourly forecasts (down the road)
    - View and prepare for upcoming forecasted freezes
  - Reporting
    - Along the lines of storm reports and drought monitor (in the works)
      - Input from NWS, University Extension, etc… on status of crops and susceptibility for a freeze
      - Reports of freeze impacts

Current Products - Daily

Growing Season Statistics
PADUCAH BARKLEY RGNL AP (KY)
USW00003816
Threshold Temperature: 28
Spring/Fall Cutoff Date: August 1

	Last Spring Occurrence			First Fall Occurrence				
Year	**Date**	**Temp**	**Missing**	**Date**	**Temp**	**Missing**	**Season Length**	**GDD**	**MGDD**
1981	Mar 12	27	0	Oct 23	28	0	224	4273	4310
1982	Apr 10	25	0	Oct 26	28	0	198	4051	4050
1983	Apr 20	27	0	Nov 17	28	0	210	4375	4218
1984	Mar 09	19	0	Nov 12	27	0	247	4274	4289
1985	Apr 09	28	0	Nov 21	28	0	225	4313	4335
1986	Mar 22	21	0	Nov 12	21	0	234	4666	4651
1987	Apr 03	24	0	Oct 08	28	0	187	4367	4159
1988	Mar 17	28	0	Oct 13	27	0	209	4247	4116
1989	Apr 11	25	0	Nov 03	24	0	205	4108	4116
1990	Apr 12	26	0	Oct 29	28	0	199	4062	3977
1991	Mar 31	25	0	Nov 03	22	0	216	4776	4674
1992	Apr 03	26	0	Nov 14	28	0	224	4127	4216
1993	Mar 15	25	0	Oct 31	24	0	229	4383	4297
1994	Apr 07	26	0	Nov 23	28	0	229	4275	4296
1995	Apr 01	26	0	Nov 03	27	0	215	4323	4298
1996	Apr 10	26	0	Nov 02	27	0	205	4016	4044
1997	Apr 09	28	0	Oct 22	28	0	195	3685	3743
1998	Mar 22	28	0	Nov 07	27	0	229	4691	4660
1999	Mar 27	25	0	Oct 25	28	0	211	4242	4154
2000	Apr 09	27	0	Nov 14	28	0	218	4304	4316
2001	Mar 28	26	0	Oct 28	27	0	213	4302	4292
2002	Mar 27	25	0	Nov 02	26	0	219	4559	4426
2003	Mar 31	28	0	Nov 14	28	0	227	4145	4189
2004	Mar 13	26	0	Nov 25	28	0	256	4386	4554
2005	Mar 20	28	0	Nov 17	22	0	241	4535	4589
2006	Mar 26	23	0	Oct 24	27	0	211	4189	4182
2007	Apr 09	25	0	Nov 06	28	0	210	4650	4477
2008	Mar 24	28	0	Nov 09	26	0	229	4289	4343
2009	Mar 04	24	0	Nov 26	28	0	266	4324	4516
2010	Mar 06	23	0	Nov 05	27	0	243	4941	4875
2011	Mar 11	28	0	Nov 11	25	0	244	4557	4522
2012	Mar 04	27	0	Nov 13	26	0	253	5015	4835
2013	missing	--	--	missing	--	--	--	--	--
Earliest	Mar 04			Oct 08			187		
Latest	Apr 20			Nov 26			266		

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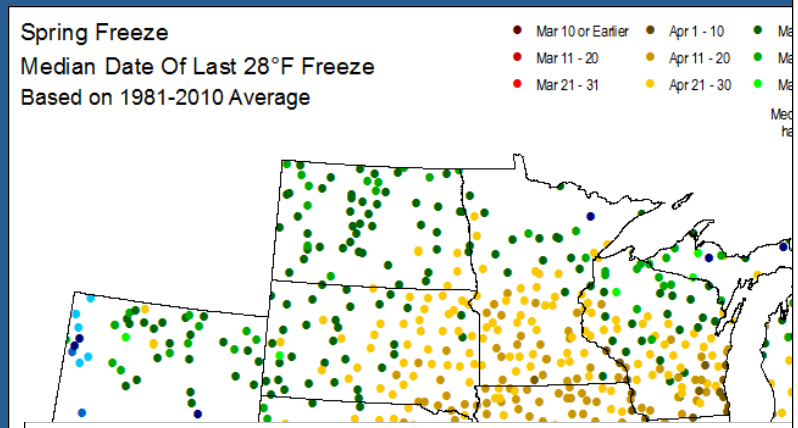
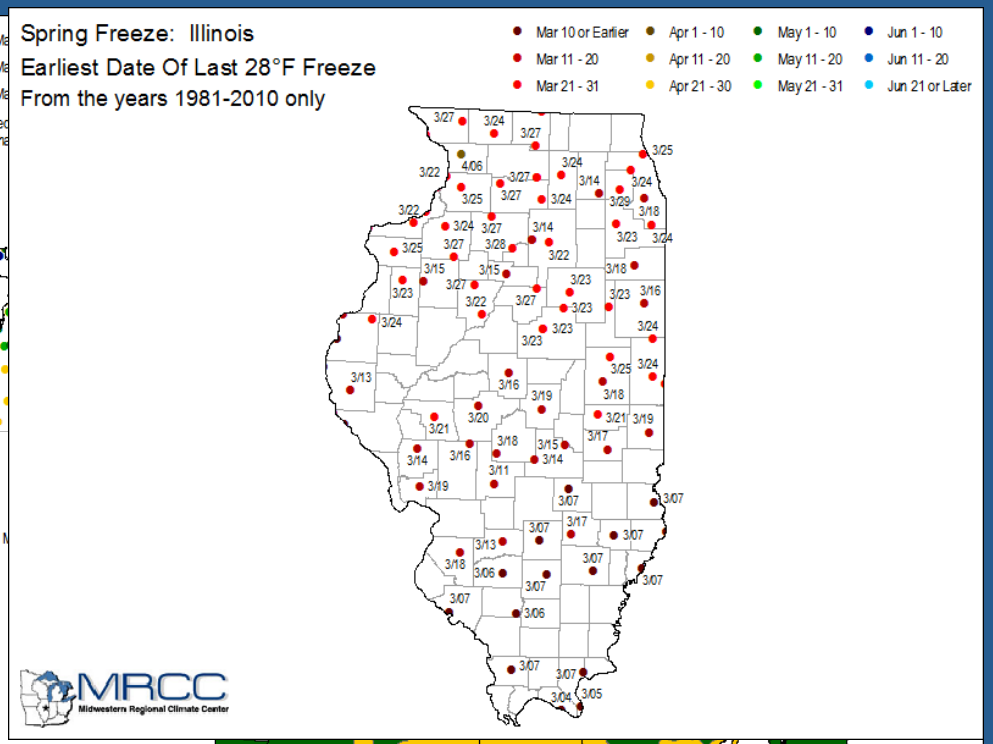
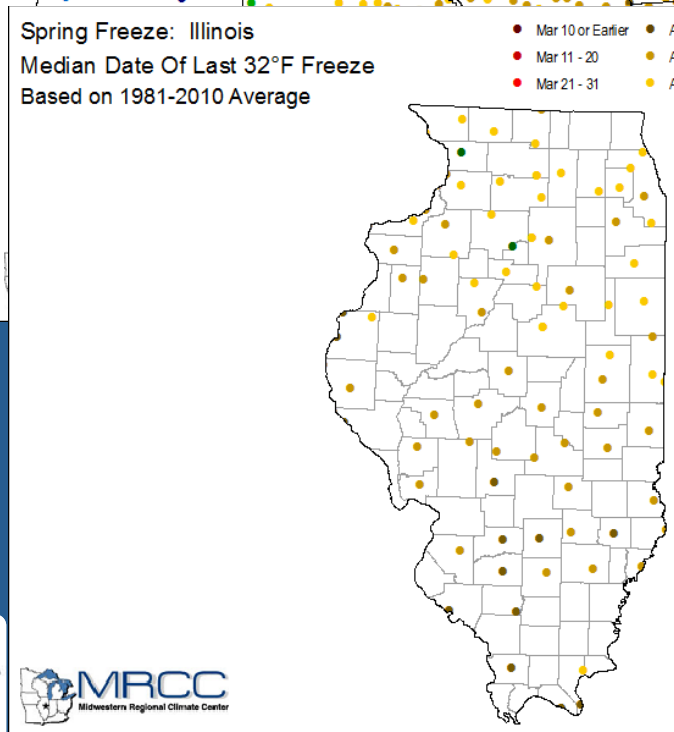
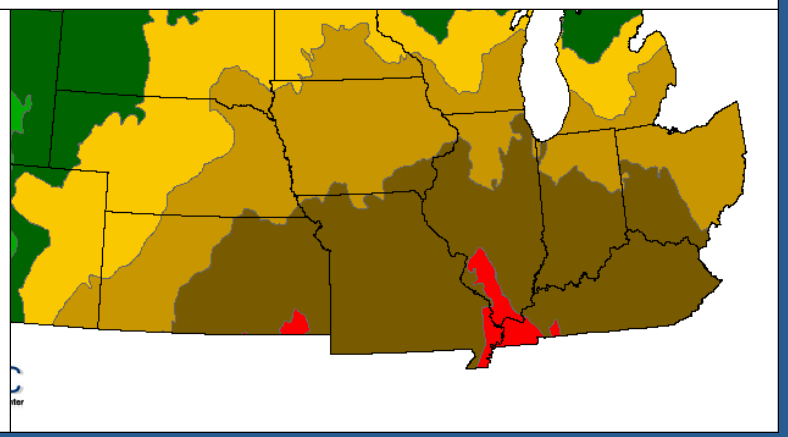
Current Products - Daily









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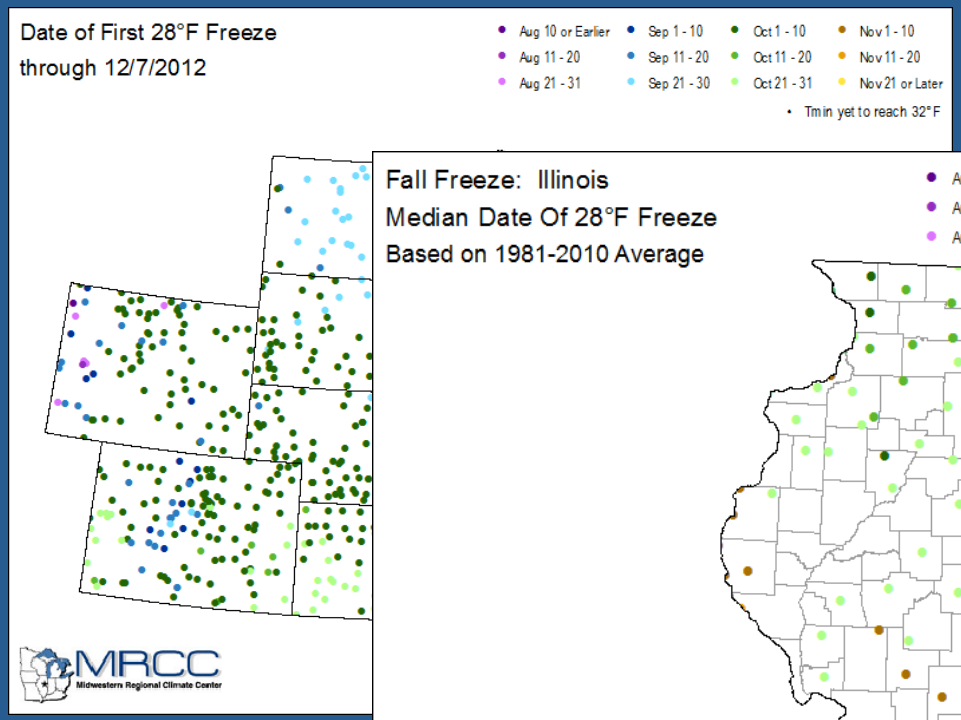
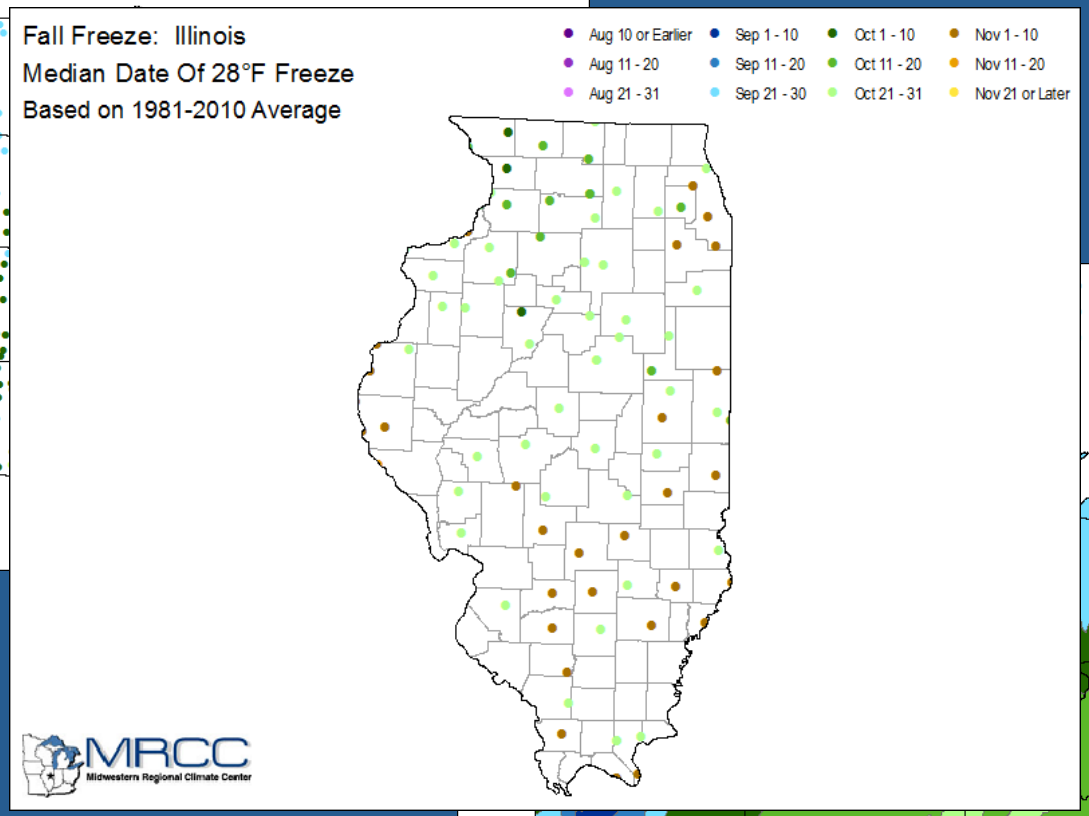
Current Products - Daily





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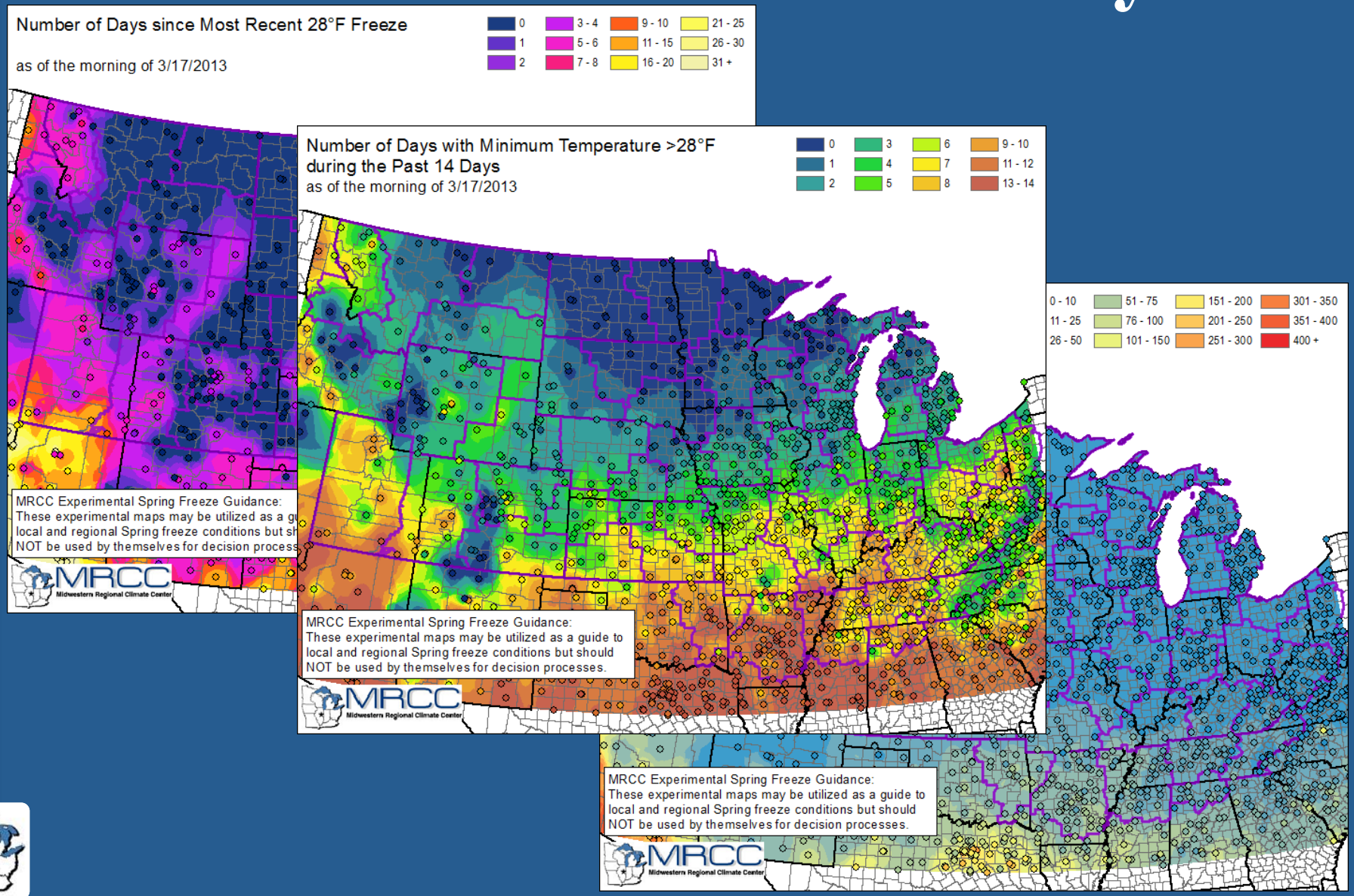
Current Products - Daily



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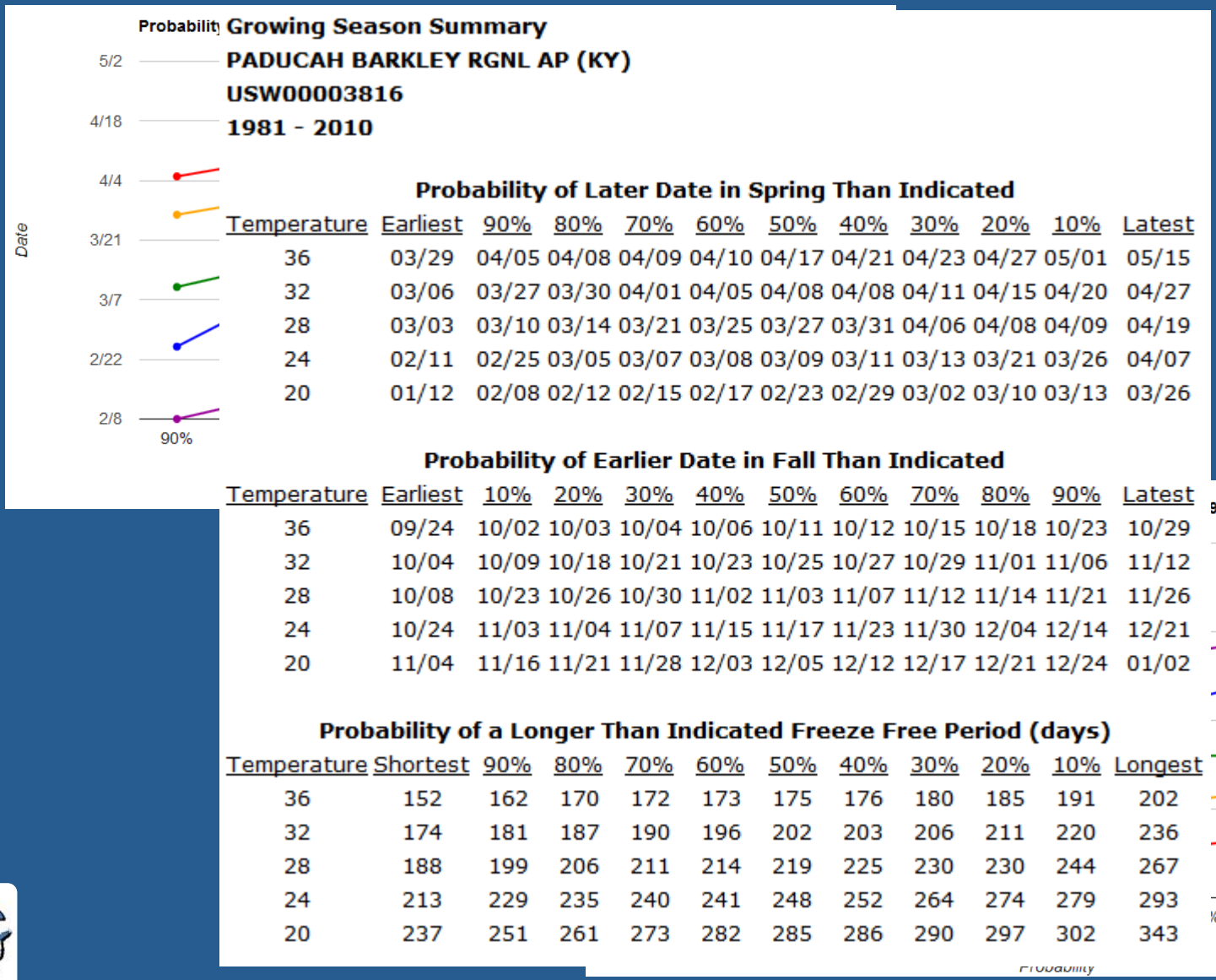
Current Products - Daily



Growing Season Summary
PADUCAH BARKLEY RGNL AP (KY)
USW00003816
1981 - 2010

Probability of Later Date in Spring Than Indicated

Temperature	Earliest	90%	80%	70%	60%	50%	40%	30%	20%	10%	Latest
36	03/29	04/05	04/08	04/09	04/10	04/17	04/21	04/23	04/27	05/01	05/15
32	03/06	03/27	03/30	04/01	04/05	04/08	04/08	04/11	04/15	04/20	04/27
28	03/03	03/10	03/14	03/21	03/25	03/27	03/31	04/06	04/08	04/09	04/19
24	02/11	02/25	03/05	03/07	03/08	03/09	03/11	03/13	03/21	03/26	04/07
20	01/12	02/08	02/12	02/15	02/17	02/23	02/29	03/02	03/10	03/13	03/26

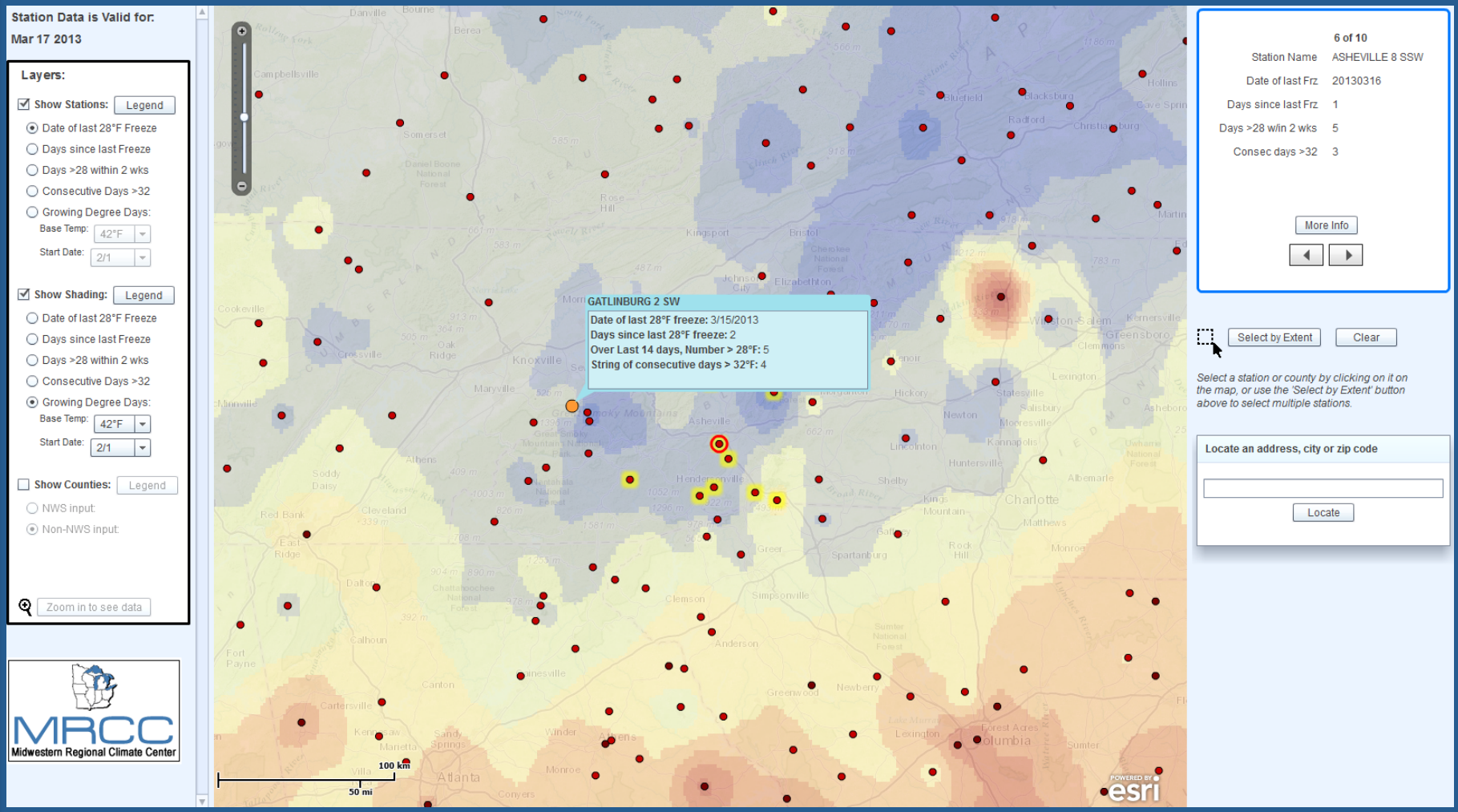
Probability of Earlier Date in Fall Than Indicated

Temperature	Earliest	10%	20%	30%	40%	50%	60%	70%	80%	90%	Latest
36	09/24	10/02	10/03	10/04	10/06	10/11	10/12	10/15	10/18	10/23	10/29
32	10/04	10/09	10/18	10/21	10/23	10/25	10/27	10/29	11/01	11/06	11/12
28	10/08	10/23	10/26	10/30	11/02	11/03	11/07	11/12	11/14	11/21	11/26
24	10/24	11/03	11/04	11/07	11/15	11/17	11/23	11/30	12/04	12/14	12/21
20	11/04	11/16	11/21	11/28	12/03	12/05	12/12	12/17	12/21	12/24	01/02

Probability of a Longer Than Indicated Freeze Free Period (days)

Temperature	Shortest	90%	80%	70%	60%	50%	40%	30%	20%	10%	Longest
36	152	162	170	172	173	175	176	180	185	191	202
32	174	181	187	190	196	202	203	206	211	220	236
28	188	199	206	211	214	219	225	230	230	244	267
24	213	229	235	240	241	248	252	264	274	279	293
20	237	251	261	273	282	285	286	290	297	302	343

Current Products - GIS



http://mrcc.isws.illinois.edu/gismaps/freeze/freeze_spring.html

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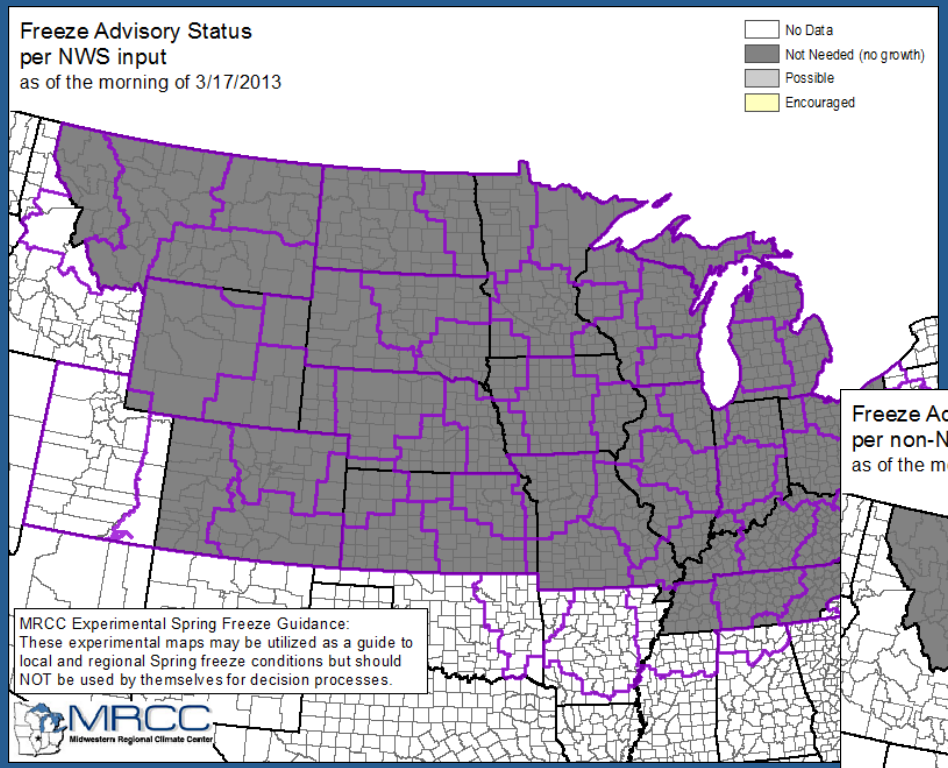
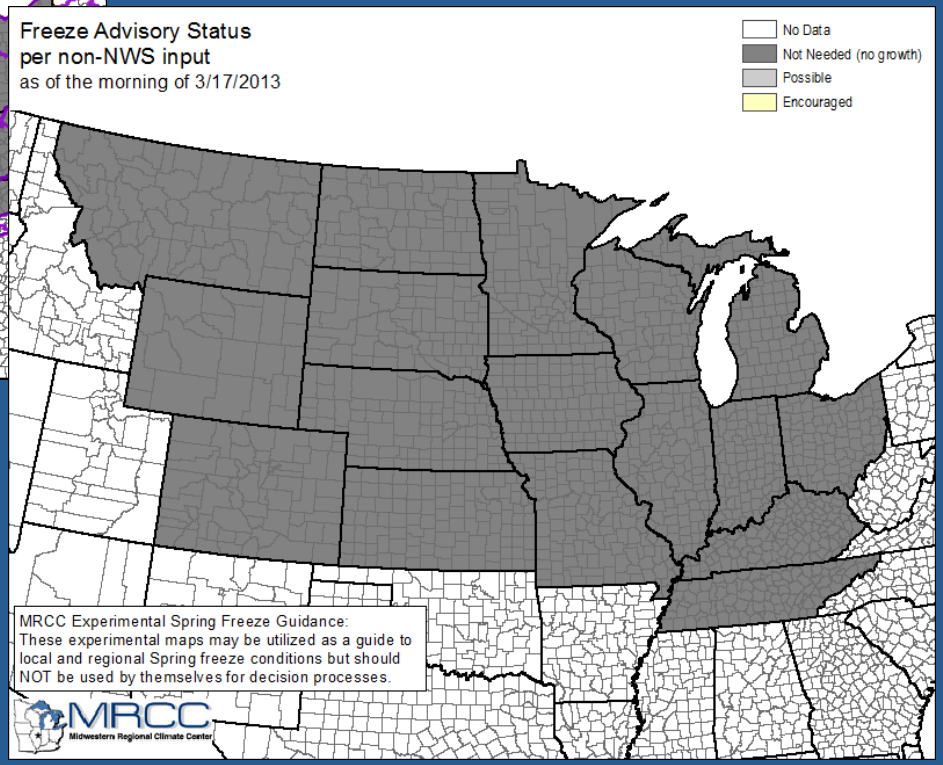
Current Products – Expert Input





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Current Products – Expert Input

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Frost/Freeze Portal: Forms

Select Different Area | Return to All Frost/Freeze Products

Freeze Advisory Guidance Form - By County Warning Area: ILX-Central Illinois/Lincoln (IL)

Freeze Advisory Guidance (select one):

- ○ No freeze advisory needed (no growth)
- ○ Possible freeze advisory needed (some vegetation susceptible)
- ○ Yes - Issue freeze advisory (most vegetation susceptible)

Enter rationale for guidance:

Select your user group:

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Contact Information:

*=Required

Name: Allan Curtis *

Email: acurtis9@illinois.edu *

Affiliation:

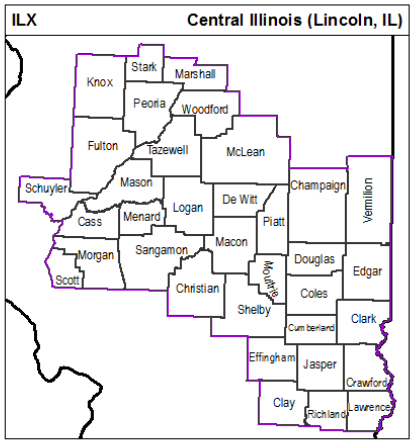
Phone:

Submit Guidance Form

Counties:

Check All | Uncheck All

- ☐ Cass, IL
- ☐ Champaign, IL
- ☐ Christian, IL
- ☐ Clark, IL
- ☐ Clay, IL
- ☐ Coles, IL
- ☐ Crawford, IL
- ☐ Cumberland, IL
- ☐ De Witt, IL
- ☐ Douglas, IL
- ☐ Edgar, IL
- ☐ Effingham, IL
- ☐ Fulton, IL
- ☐ Jasper, IL
- ☐ Knox, IL
- ☐ Lawrence, IL
- ☐ Logan, IL
- ☐ Macon, IL
- ☐ Marshall, IL
- ☐ Mason, IL
- ☐ McLean, IL
- ☐ Menard, IL
- ☐ Morgan, IL
- ☐ Moultrie, IL
- ☐ Peoria, IL
- ☐ Piatt, IL
- ☐ Richland, IL
- ☐ Sangamon, IL
- ☐ Schuyler, IL
- ☐ Scott, IL
- ☐ Shelby, IL
- ☐ Stark, IL
- ☐ Tazewell, IL
- ☐ Vermilion, IL
- ☐ Woodford, IL



Listserv

- Currently have a listserv populated with 158 experts
  - State Climatologists
  - NWS Forecasters
  - University Extension
  - NCDC and the RCCs
- Ever expanding
  - Looking to garner more input from private sector and USDA

Questions?
Comments?
Suggestions?

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Resources/Links

- 2007 Technical Report
  - http://www1.ncdc.noaa.gov/pub/data/techrpts/tr200801/tech-report-200801.pdf
- Chilling Hours
  - http://www.hort.purdue.edu/fff/FFF12/FFF12-01.pdf
- MRCC MWCW
  - http://mrcc.isws.illinois.edu/cliwatch/watch.htm#
- MRCC NWS Frost/Freeze
  - http://mrcc.isws.illinois.edu/cliwatch/NWS/index.html
- MRCC Frost/Freeze Probabilities
  - http://mrcc.isws.illinois.edu/MACS/web/Station/Seasonal/StnFrostProb.jsp