

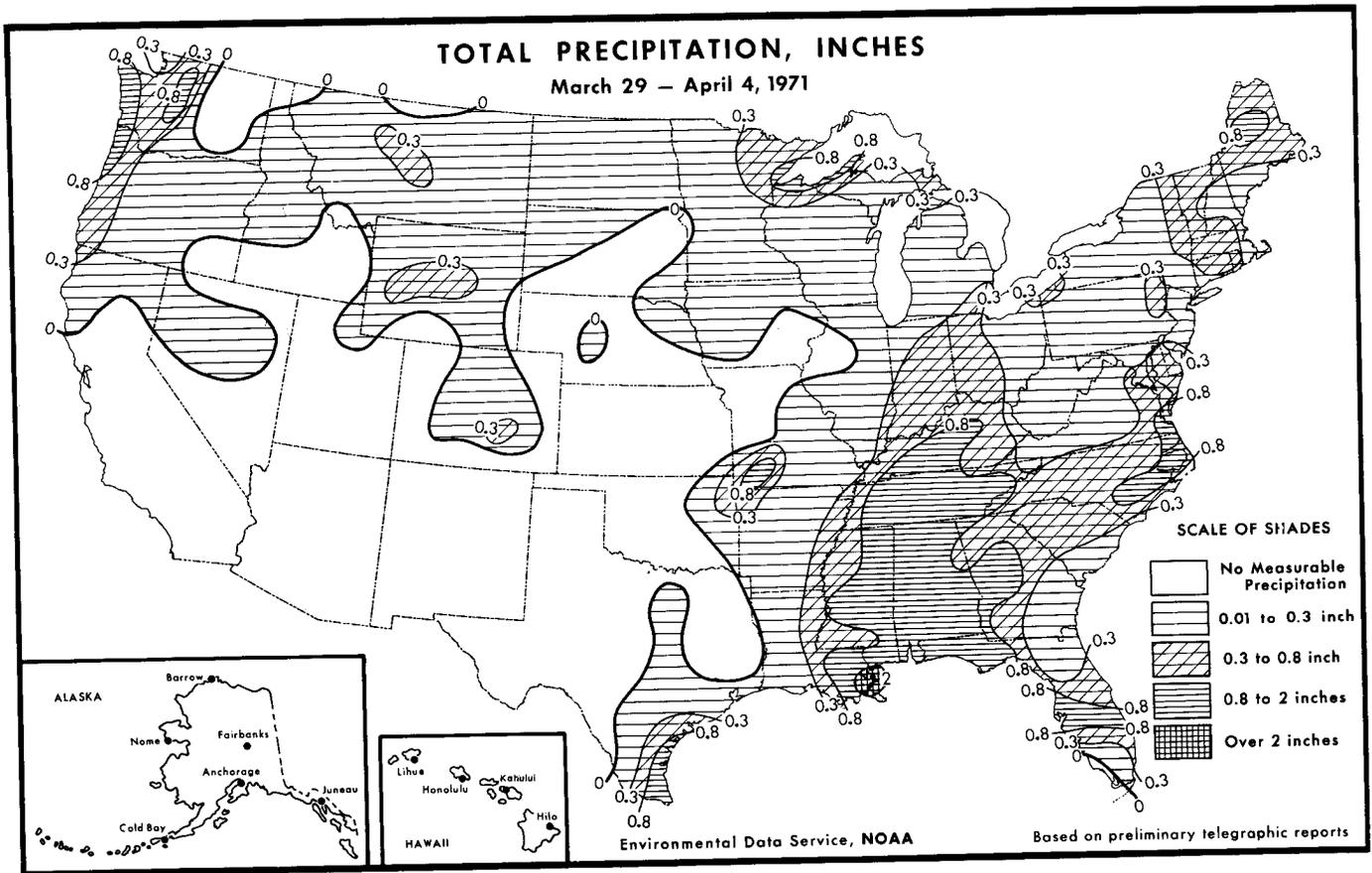
# Weekly Weather & Crop Bulletin

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Edited by Lucius W. Dye

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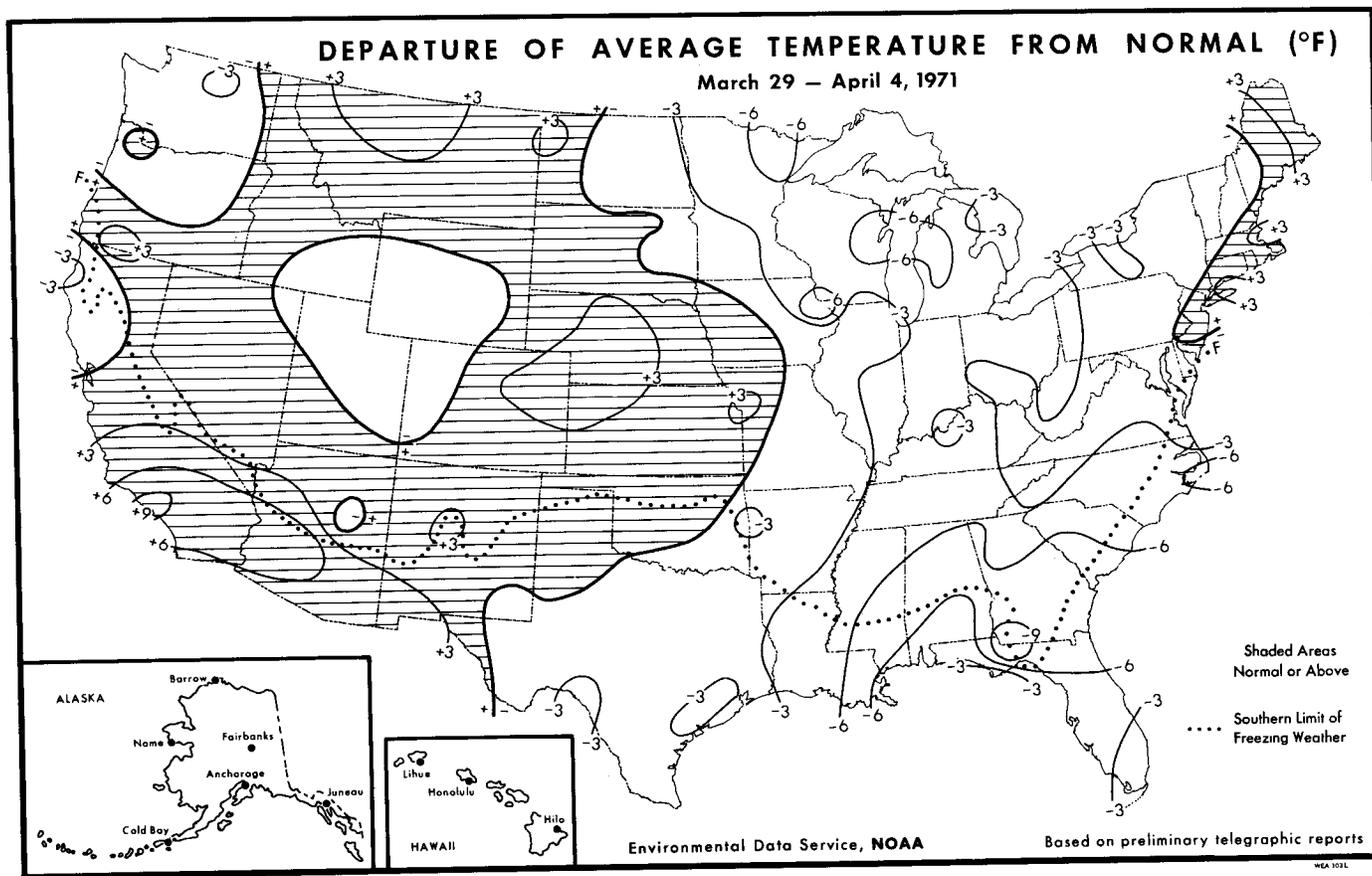
## NATIONAL WEATHER SUMMARY

**HIGHLIGHTS:** Temperatures ranged widely and changed frequently. Record high temperatures were recorded in the Southwest and subfreezing weather occurred in Dixie. The southwest quarter of the Nation received no rain or only widely scattered sprinkles. Drought conditions threaten this region and southern Florida.

**PRECIPITATION:** Three areas received light precipitation early in the week. Light rain fell along the Washington and Oregon coast, flurries occurred south and east of the Great Lakes and showers fell along the southern Atlantic and Gulf coasts from Maryland to Louisiana. The snow at Erie, Pa., brought their season total to 116.2 inches; this is more than fell in any previous season. Strong winds filled the air with sand and dust in the Great Basin and in the western portions of the Great Plains. Emporia, Kans., registered a peak gust of 70 m.p.h. Wednesday forenoon. The rain

in the Northwest changed to snow in the northern Rocky Mountains and northern Great Plains. Snow accumulated to 6 inches at Lander, Wyo., and to 5 inches at Hibbing, Minn. Light rain fell over most of the eastern half of the Nation Thursday and along the Atlantic coast on Friday. Weekend precipitation was limited mostly to the light snow flurries in the central Rocky Mountains and in the vicinity of the Great Lakes.

Weekly totals exceeded 1.00 inch along the Washington coast and from Tennessee to the Gulf of Mexico. Most of the northern border States received less than 0.10 inch. Most eastern areas received less than 0.50 inch. A large area from California to Kansas, Oklahoma, and western Texas received no precipitation or only light sprinkles or flurries. Some parts of the Southwest were becoming very dry. This is especially true in western Texas where little rain has fallen since last autumn.



**TEMPERATURE:** Texas experienced an abrupt temperature change Monday with maximums ranging from the upper 60's to low 80's in contrast to the 100° heat of the previous weekend. High temperatures continued in the West. Phoenix, Ariz., registered 95° Monday, the highest temperature of record for so early in the season. Warming occurred over much of the Mississippi River Tuesday while the East cooled. The temperature at Montgomery, Ala., dropped to 29°. Afternoon temperatures Tuesday ranged widely from near freezing in northern Maine to 100° at Blythe, Calif.. Winslow, Ariz., recorded 85° Tuesday afternoon, the warmest day of record for so early in the spring. The northern Great Plains were as warm as Florida. Miles City, Mont., warmed to 67° equaling the maximum at Tampa, Fla. Colder air moved into northern Montana late Tuesday and spread southward and eastward. Northeastern Montana did not warm to the freezing mark Wednesday afternoon when the maximum temperature at Lewiston was 26°. As the cold air spread southward temperatures dropped 40° or more. Hill City, Kans.,

registered 92° at 4 p.m. Wednesday, 50° at 8 p.m., and 37° at 2 a.m. Thursday. The strong winds added bite to the frigid temperatures. A deep low pressure area moved from the central Great Plains to a position north of Lake Superior. Strong gusty winds in the northern Great Plains picked up snow and dust and the visibility became reduced to near zero in some areas. Afternoon temperatures remained below freezing Friday and Saturday from North Dakota to Michigan. Early morning temperatures were in the 30's as far south as the northern portions of the Gulf States. Jackson and Meridian, Miss., registered 32° Saturday morning. Afternoon temperatures remained about 10° below normal in the South over the weekend.

Weekly mean temperatures were below normal over the central Rocky Mountains and from the Mississippi River Valley to the Atlantic Ocean. Most of the West averaged slightly warmer than normal.

L. W. Dye

## NATIONAL AGRICULTURAL SUMMARY

**AGRICULTURAL HIGHLIGHTS:** Fieldwork off to a fast start in the Corn Belt. \* Drought conditions continue in the Southwest. \* Warm temperatures aided wheat growth on the Great Plains. \* Pasture growth slow in the East.

**SMALL GRAINS:** Warm temperatures aided wheat growth on the central Great Plains. Fall-seeded acreage is greening rapidly. However for the 2d straight week winds reduced topsoil moisture from Kansas and Oklahoma westward to California. A soaking rain would be extremely helpful for the grain crop in the entire western part of the Nation. Prospects for dryland grain crops continue poor in Texas as the drought continues.

Strong winds caused soil erosion in Nebraska, plus doing moderate damage to Colorado wheatfields. Moderate damage occurred to about 10% of Montana's wheat crop. Grains are developing well in the Pacific Northwest. Some stands are spotty in Washington.

In the South small grains are in good condition. Moisture is plentiful but warm temperatures are needed to stimulate growth. Wheat prospects in the north central States remain good to excellent. Development has been slowed by cool weather from the middle Atlantic States to the northern Great Plains. Greening has been slow.

Seeding of spring grains made good progress across the Nation. Kansas oats seeding remains behind last year's good start. Oats seeding in the Corn Belt is off to a fast start and acreage is seeded well ahead of 1970.

**OTHER CROPS:** Wet fields continue to limit planting and land preparation activities in the South. The situation is not critical as farmers were able to work lighter soils during the week. Dry soils in the middle Atlantic and southern Corn Belt States allowed farmers to make good progress in their spring fieldwork. Virtually no fieldwork has started in northern Corn Belt areas. Warm temperatures and dry soils increased farming activity in the West. Fields became easy to work. However planting in south-central Texas continued to fall farther behind schedule as drought conditions held for another week.

Early-planted cotton is emerging in Arizona. Clear skies aided planting in both California and Arizona. A few fields were also seeded in Louisiana and Alabama.

Plowing for corn is well ahead of last year in the Corn Belt. Soggy fields slowed planting in the South but some acreage was seeded as far north as Tennessee. Over three fourths of the tobacco plant beds are seeded in Kentucky and

Tennessee. Beds are improving in North Carolina and Virginia. Transplanting is beginning in North Carolina with nearly 40% of the crop set in Georgia.

**Fruits and Nuts:** Orange harvesting continued slow in Florida. Grapefruit picking declined. In California valencia orange harvest increased and picking of navels remained steady. Citrus picking progressed normally in Arizona and Texas. Warm weather aided development of deciduous fruit and nut trees in California. Most trees are in either the full bloom or petal fall stage. Orchard pruning was active in many States but was completed in Colorado. Peaches are mostly good and in full bloom throughout the South. Cold weather damage to the Georgia crop is not fully assessable at this time.

**Vegetables:** Vegetable shipments increased from Florida with cabbage and celery available from all producing areas. The South Texas spring vegetable crop made good progress with frequent irrigation. Onion pulling continued active in the Lower Rio Grande Valley. Arizona vegetables made good progress with lettuce cutting active in the Salt River Valley, Pima, and Pinal County areas. Good supplies of lettuce are available from southern California with light supplies expected from Salinas Valley later this week. Strawberry picking increased in southern California and Louisiana. Vegetables are mostly fair in the South with planting gaining momentum in North Carolina.

**PASTURES AND LIVESTOCK:** Below-normal temperatures continued to slow pasture growth in the eastern half of the Country. However moisture is adequate and growth should be rapid once warm temperatures arrive. Cool season grasses are providing good grazing in Arkansas with Illinois pastures supplying about 1/5 the roughage requirement. Feed supplies in the Northern States are plentiful and should last until pastures are ready for grazing. Supplemental feeding is heavy in the drought stricken Southwest. Many ranchers from Arizona to Texas are hauling water to their herds. Livestock feeding was also heavy in the Northwest. Oregon hay supplies are becoming short. Coyotes are causing an increase in baby calf deaths in Nevada. Scours are evident in some Nebraska herds, but no abnormal losses have occurred. Livestock losses were at a minimum from the weather although extra care of young animals was needed in some areas.

Steve Pscodna  
Agricultural Statistician

Temperature and Precipitation Data for the Week Ending Midnight, April 4, 1971

States and Stations	Temperature °F		Precipitation Inches		States and Stations	Temperature °F		Precipitation Inches		States and Stations	Temperature °F		Precipitation Inches	
	Average	Departure*	Total	Departure*		Average	Departure*	Total	Departure*		Average	Departure*	Total	Departure*
ALA.Birmingham . . .	51	- 8	1.3	0	New Orleans . . .	58	- 6	2.5	+1.4	OKLA.Okla. City . . .	55	+ 1	T	- .6
Mobile . . .	60	- 4	1.9	+ .1	Shreveport . . .	58	- 3	.1	-1.0	Tulsa . . .	56	+ 3	.2	- .6
Montgomery . . .	55	- 5	1.2	- .2	MAINE.Caribou . . .	34	+ 5	.5	- .1	OREG.Astoria . . .	46	- 1	1.3	- .2
ALASKA.Anchorage . . .	28	- 1	T	- .1	Portland . . .	37	0	.2	- .8	Burns . . .	41	0	T	- .2
Barrow . . .	-11	- 2	T	0	MD.Baltimore . . .	47	- 2	.3	- .5	Medford . . .	50	+ 4	T	- .3
Fairbanks . . .	7	-11	T	- .1	MASS.Boston . . .	46	+ 4	.2	- .8	Pendleton . . .	45	- 2	T	- .2
Juneau . . .	35	+ 1	1.2	+ .5	Chatham . . .	41	-	-	-	Portland . . .	49	+ 1	.3	- .3
Nome . . .	6	- 8	T	- .2	MICH.Alpena . . .	30	- 2	T	- .6	Salem . . .	46	- 2	.4	- .4
ARIZ.Flagstaff . . .	42	+ 3	0	- .3	Detroit . . .	36	- 5	.4	- .2	PA.Allentown . . .	42	- 1	.4	- .5
Phoenix . . .	71	+ 8	0	- .1	Flint . . .	34	- 3	.1	- .5	Erie . . .	36	- 4	.5	- .2
Tucson . . .	66	+ 5	0	- .1	Grand Rapids . . .	33	- 6	.2	- .4	Harrisburg . . .	44	- 2	.2	- .5
Winslow . . .	49	- 1	0	- .1	Houghton Lake . . .	28	- 6	.1	- .3	Philadelphia . . .	47	+ 1	.1	- .7
Yuma . . .	73	+ 6	0	- .1	Lansing . . .	34	- 5	.2	- .4	Pittsburgh . . .	40	- 3	.1	- .7
ARK.Fort Smith . . .	53	- 4	.3	- .5	Marquette . . .	29	- 4	T	- .5	Scranton . . .	40	- 2	.4	- .3
Little Rock . . .	56	- 1	.2	-1.0	Muskegon . . .	34	- 5	.1	- .4	R.I.Providence . . .	44	+ 2	.3	- .7
CALIF.Bakersfield . . .	65	+ 6	0	- .2	S.Ste.Marie . . .	27	- 4	.4	- .1	S.C.Charleston . . .	54	- 7	.1	- .7
Eureka . . .	47	- 3	.2	- .6	MINN.Duluth . . .	23	- 6	.8	+ .3	Columbia . . .	53	- 6	.6	- .4
Fresno . . .	61	+ 3	0	- .4	Internat Falls . . .	22	- 6	.3	0	Greenville . . .	52	- 5	.6	- .4
Los Angeles . . .	69	+ 9	0	- .3	Minneapolis . . .	34	- 3	.2	- .2	S.DAK.Aberdeen . . .	37	0	T	- .4
Red Bluff . . .	57	- 1	T	- .5	Rochester . . .	31	- 5	.1	- .4	Huron . . .	36	- 1	T	- .4
San Diego . . .	64	+ 4	0	- .3	St. Cloud . . .	30	- 4	.1	- .2	Rapid City . . .	39	+ 2	T	- .3
San Francisco . . .	55	0	0	- .4	MISS.Jackson . . .	54	- 6	1.1	- .1	Sioux Falls . . .	38	0	.1	- .3
Stockton . . .	58	+ 1	0	- .4	Meridian . . .	54	- 7	1.4	0	TENN.Chattanooga . . .	50	- 6	1.1	- .1
COLO.Denver . . .	44	+ 3	.1	- .3	MO.Columbia . . .	47	- 1	.1	- .6	Knoxville . . .	52	- 3	1.1	+ .2
Grand Junction . . .	45	- 1	0	- .2	Kansas City . . .	53	+ 4	T	- .8	Memphis . . .	53	- 4	.6	- .6
Pueblo . . .	46	+ 1	.5	+ .3	St. Louis . . .	47	- 2	T	- .9	Nashville . . .	50	- 5	1.2	+ .1
CONN.Bridgeport . . .	45	+ 3	.3	- .6	Springfield . . .	48	- 2	1.1	+ .2	TEX.Abilene . . .	59	- 1	0	- .3
Hartford . . .	44	+ 1	.6	- .2	MONT.Billings . . .	40	+ 1	.3	0	Amarillo . . .	53	+ 1	T	- .2
D.C.Washington . . .	49	- 1	.5	- .2	Glasgow . . .	36	+ 1	.1	0	Austin . . .	62	- 2	T	- .6
FLA.Apalachicola . . .	62	- 2	.8	- .2	Great Falls . . .	40	+ 4	.3	+ .1	Beaumont . . .	63	- 1	.1	- .7
Ft. Myers . . .	66	- 5	.3	- .3	Havre . . .	39	+ 5	T	- .2	Brownsville . . .	70	- 1	1.8	+1.5
Jacksonville . . .	57	- 8	.2	- .6	Helena . . .	39	+ 2	.1	- .1	Corpus Christi . . .	66	- 2	1.3	+ .9
Key West . . .	71	- 3	0	- .5	Kalispell . . .	40	+ 3	T	- .1	Dallas . . .	61	0	.1	- .7
Lakeland . . .	63	- 6	.5	- .3	Miles City . . .	40	+ 2	T	- .2	Del Rio . . .	64	- 4	T	- .3
Miami . . .	71	- 1	.3	- .3	Missoula . . .	40	+ 1	.1	- .1	El Paso . . .	62	+ 3	0	- .1
Orlando . . .	64	- 4	.8	- .1	NEBR.Grand Island . . .	45	+ 3	T	- .4	Fort Worth . . .	58	- 2	.1	- .6
Tallahassee . . .	53	-11	.9	- .6	Lincoln . . .	46	+ 1	T	- .5	Galveston . . .	65	0	T	- .7
Tampa . . .	63	- 5	.9	+ .1	Norfolk . . .	41	0	T	- .5	Houston . . .	59	- 5	T	- .7
GA.Atlanta . . .	52	- 4	1.0	- .2	North Platte . . .	43	+ 2	T	- .4	Lubbock . . .	56	+ 1	0	- .2
Augusta . . .	52	- 7	.3	- .6	Omaha . . .	43	+ 1	.1	- .4	Midland . . .	58	- 2	0	- .1
Macon . . .	54	- 8	1.4	+ .3	Valentine . . .	41	+ 3	T	- .4	San Angelo . . .	62	- 1	0	- .2
Savannah . . .	56	- 6	.1	- .8	NEV.Ely . . .	39	+ 1	T	- .2	San Antonio . . .	63	- 2	T	- .5
HAWAII.Hilo . . .	70	- 2	7.5	+4.3	Las Vegas . . .	62	+ 3	0	- .1	Victoria . . .	63	- 4	.4	- .1
Honolulu . . .	75	+ 1	2.6	+2.1	Reno . . .	46	+ 2	T	- .2	Waco . . .	62	0	T	- .8
Kahului . . .	75	+ 2	.4	- .1	Winemucca . . .	42	+ 1	T	- .2	Wichita Falls . . .	58	- 1	0	- .4
Lihue . . .	-	-	-	-	N.H.Concord . . .	38	0	.3	- .4	UTAH.Blanding . . .	44	0	0	- .3
IDAHO.Boise . . .	46	+ 1	T	- .3	N.J.Atlantic City . . .	44	- 2	.2	- .7	Salt Lake City . . .	44	- 1	.7	+ .1
Lewiston . . .	47	+ 1	.1	- .2	Trenton . . .	47	+ 1	.1	- .7	VT.Burlington . . .	33	- 1	T	- .4
Pocatello . . .	39	- 2	T	- .2	N.MEX.Albuquerque . . .	53	+ 3	0	- .1	VA.Lynchburg . . .	50	- 1	1.1	- .8
ILL.Cairo . . .	51	- 3	.3	- .8	Roswell . . .	54	0	0	- .1	Norfolk . . .	51	- 2	1.3	+ .6
Chicago . . .	41	- 2	T	- .8	N.Y.Albany . . .	39	- 1	.6	0	Richmond . . .	50	- 3	.3	- .5
Moline . . .	42	- 1	T	- .7	Binghamton . . .	34	- 3	.3	- .4	Roanoke . . .	51	0	T	- .8
Peoria . . .	42	- 2	T	- .8	Buffalo . . .	36	- 1	.1	- .6	WASH.Colville . . .	43	0	T	- .2
Rockford . . .	39	- 2	T	- .7	New York . . .	47	+ 1	.2	- .7	Omak . . .	43	- 3	0	- .2
Springfield . . .	44	- 3	.1	- .7	Rochester . . .	35	- 4	.1	- .5	Quillayute . . .	43	- 2	1.5	- .7
IND.Evansville . . .	48	- 4	.5	- .5	Syracuse . . .	38	- 1	.2	- .6	Seattle-Tacoma . . .	45	- 1	.6	- .1
Fort Wayne . . .	38	- 5	.5	- .2	N.C.Asheville . . .	49	- 2	.6	- .2	Spokane . . .	42	0	T	- .3
Indianapolis . . .	42	- 3	.4	- .5	Charlotte . . .	51	- 4	.5	- .4	Walla Walla . . .	49	0	T	- .3
South Bend . . .	37	- 4	.2	- .6	Greensboro . . .	48	- 4	.8	0	Yakima . . .	45	- 1	T	- .1
IOWA.Burlington . . .	43	- 1	T	- .8	Hatteras . . .	49	- 6	.6	- .1	W.VA.Beckley . . .	44	- 1	.2	- .9
Des Moines . . .	43	+ 1	T	- .5	Raleigh . . .	51	- 4	.7	0	Charleston . . .	46	- 4	.2	- .8
Dubuque . . .	34	- 6	.1	- .6	Wilmington . . .	54	- 4	.3	- .5	Huntington . . .	49	- 2	.2	- .8
Sioux City . . .	42	+ 1	.1	- .3	N.DAK.Bismarck . . .	34	- 1	T	- .2	Parkersburg . . .	46	- 3	.2	- .7
KANS.Concordia . . .	48	+ 2	T	- .4	Fargo . . .	30	- 3	.1	- .2	WIS.Green Bay . . .	28	- 8	T	- .4
Dodge City . . .	48	+ 1	T	- .3	Williston . . .	37	+ 4	.1	- .1	La Crosse . . .	32	- 7	.1	- .5
Goodland . . .	45	+ 4	T	- .3	OHIO.Akron-Canton . . .	40	- 3	.2	- .5	Madison . . .	34	- 3	T	- .5
Topeka . . .	50	+ 2	T	- .6	Cincinnati . . .	45	- 4	.5	- .4	Milwaukee . . .	33	- 5	.1	- .4
Wichita . . .	51	0	T	- .5	Cleveland . . .	37	- 4	.2	- .6	WYO.Casper . . .	35	- 2	.3	0
KY.Lexington . . .	45	- 4	.8	- .3	Columbus . . .	42	- 3	.3	- .5	Cheyenne . . .	38	+ 1	T	- .4
Louisville . . .	47	- 2	.7	- .1	Dayton . . .	43	- 2	.5	- .3	Lander . . .	35	- 2	.5	+ .1
LA.Baton Rouge . . .	58	- 6	1.3	- .3	Toledo . . .	37	- 4	.4	- .2	Sheridan . . .	39	+ 2	.1	- .3
Lake Charles . . .	60	- 4	.1	- .8	Youngstown . . .	37	- 5	.2	- .6	P.R. San Juan . . .	79	+ 3	.6	0

\* Departures are from 30-year means (1931-60). Based on preliminary reports

## CONDENSED STATE SUMMARIES

These summaries provide brief descriptions of condition and activities important on a national scale. Detailed reports of crop and weather conditions during the growing season are contained in State issues of Weekly Weather and Crop Bulletins published by field offices of the Statistical Reporting Service, U.S.D.A. in cooperation with NOAA State Climatologists.

**ALABAMA:** Sunny and mild days and clear and cool nights most of the week. Warmer Thursday and Friday with general rain. Temperatures for week much colder than usual. Rainfall moderate except heavy in extreme south. Farmers behind planting and land preparation schedule because rain and wet fields, situation not yet critical. Fieldwork limited to 1 or 2 days scattered areas. Most corn planting limited to Baldwin-Mobile and Geneva-Houston County areas. Few fields cotton seeded. Cool temperatures hard on emerged corn and vegetable crops. Irish potatoes growing good Baldwin area, about half seeded on Sand Mountain. Small grains fair to good. Peaches 80% to 90% full bloom--little damage from freeze of previous week-end. Livestock mostly fair.

**ARIZONA:** Skies were mostly clear and temperatures were above normal over State this week. No precipitation. Early-planted cotton emerging central, southwest areas. Planting continues central areas, nearly complete southern Yuma. Small grains making favorable progress. Many fields heading, early plantings dough stage. Strong winds caused some lodging. Early sorghum plantings have emerged. Planting, field preparations continue. Alfalfa hay harvest active central, southwest areas. Yuma cantaloupes making good growth. Carrots, onions making good progress. Spring lettuce harvest continued Salt River Valley, Pima and Pinal counties. Cochise County lettuce making good growth. Valencia orange, grapefruit harvest active Yuma and Salt River Valley. Lower elevation, desert ranges very dry, providing limited spring feed. Supplemental feeding continues most areas. Many ranchers pumping, hauling stockwater.

**ARKANSAS:** Cool week with weekly temperatures about 3° below normal ranging in 50's. Daily extremes: 21° to 79°. Showers with cold front midweek produced mostly less than 0.50 inch. Hot Springs high with 1.08 inches. 1 to 5 inches of snow extreme north last night of period. Land preparation well underway lighter soils, but little planting to date on heavy clay land. Very little planting so far, but significant acreage ready. Few fields rice, corn, and sorghum seeded, notably in south. Small grains generally good condition and making favorable growth. More moisture needed some areas, especially northwest. Fruit and vegetable prospects mostly favorable. Tomatoes being transplanted to fields south. Livestock came through relatively mild winter in good condition. Cool season grasses providing much grazing, but warm season grasses such as Bermuda have not made much growth.

**CALIFORNIA:** Average temperatures above normal except north of about 40° latitude. Greatest positive departures in desert and Los Angeles Basin. Light precipitation in northern tier of counties on 30th with amounts generally less than 0.25 inches. Warm weather, winds quickly drying fields. Small grains heading out all early areas. Limited moisture, winds hurting late plantings. First cutting alfalfa most districts San Joaquin Valley. Planting cotton full swing southern section; increasing San Joaquin Valley. Planting field corn underway northern San Joaquin, southern Sacramento Valleys. Fieldwork active rice fields. Warmer weather enhanced development deciduous

fruit and nut trees. Most peaches, plums, nectarines, prunes and apricots petal fall stage and trees leafing. Cherries, apples, and pears near full bloom. Grapes starting to leaf out. Picking Fuerte avocados continues. Harvest navel oranges steady. Valencia oranges increasing, picking lemons continues active, fruit quality good. Harvest grapefruit moderate level. Planting vineyards and orchards continues. Ranges excellent north, dry south. Cattle moving to irrigated pasture, feedlots. Some early lambs marketed. Milk production increased, egg production normal. Delta asparagus moderate volume. Some supplies diverted processors. Broccoli-cauliflower shipments coastal districts light to moderate. Imperial carrot harvest increasing. Celery supplies southern California good volume. Southern California sweet corn planting continuing. Imperial lettuce harvest complete. Palo Verde supplies reached peak levels, expected begin decreasing. Lettuce harvesting underway Santa Maria, San Luis Obispo, Kern areas. Light supplies expected Salinas later this week. Strawberry picking increasing Southern California. Fresh market tomatoes making good growth. Planting processing tomatoes continuing.

**COLORADO:** Warm first of week, cooler after cold front passage late Wednesday. Mostly light snow some areas central and northern mountains. Scattered light to moderate rain or snow east portion. Soil preparation full swing all areas except northwest. Planting spring barley 22% complete, oats 19% seeded. Limited acreage beets seeded. Condition winter wheat still good. High wind during week caused moderate damage most wheat areas. Crop greening rapidly. Substantial growth evident southeast. All areas need moisture. Soil moisture supplies short to adequate eastern plains, short southwest area. Pruning fruit orchards completed. Lambing and calving past peak. All livestock good.

**FLORIDA:** Two cold front passages depressed temperatures well below normal. Temperatures averaged 5° to 8° below normal northern and central sections and 1° to 3° below normal southern section. Morning temperatures on 31st of 38° and 28° at Tampa and Tallahassee, respectively, set record lows for date. Rainfall average 0.40 inch to 0.90 inch northern and central sections and 0.20 inch in southern section, mainly in the vicinity of front. Planting field crops active as weather permits, frequent rains Panhandle. Some late frost damage tobacco. Cool nights and inadequate moisture central and south delaying pasture growth. Livestock fair. Citrus trees excellent condition. Abundant new flush growth. Long erratic bloom. Nearing end. Orange harvest slow. Grapefruit harvest declining. Vegetables shipment show slight increase. Tender vegetable harvest increasing slowly southwest sector. Beans, potatoes, dominate harvest east coast. Cabbage, celery available all producing areas. Planting tempo declined appreciably. Sweet corn, celery planting expected central areas most April; most other crops planted.

**GEORGIA:** Rain beginning of week and again on Friday. Totals were mostly 0.50 to 1.50 inches over northwestern half of State but declined to

less than 0.25 inch in southeast. Continued cool throughout week with averages ranging from 2° to 9° below normal. Freezing occurred in extreme north on 3 or 4 mornings and frost was reported as far south as Albany. Augusta and Macon had 31° April 3 for new record lows for date. Lowest temperature was 23° at Blairsville on March 31 and April 3. Soil moisture mostly surplus. Wet and cool soils delayed land preparation and planting. Main activities were fertilizing pastures, spraying fruit trees, and completing preparations for spring planting. Small grains good. Tobacco setting 39% complete with conditions poor to mostly fair. Corn 7% planted, equal to last years wet spring plantings. Peaches fair to good with cold weather damage not yet fully known. Pastures and cattle fair to good.

**HAWAII:** Weather generally wet. Rainfall light to moderate with occasional heavy downpours. Wet fields slowed farm operations, but progress crops fair to good. Insect infestations heavy, spray programs intensified. Sugarcane harvesting active. Progress pineapples fair to good with light harvesting, mainly for fresh market sales. Light supplies bananas and papayas. Vegetable supplies adequate, especially leafy crops. Pastures and cattle continued fair to good condition with ample range feed.

**IDAHO:** Temperatures averaged near to 5° below normal with largest departures east. Maxima ranged from 50° to 72° and minima ranged from 5° to 30°. Precipitation amounts light to heavy in east while light to moderate amounts reported over remainder of State. Totals averaged from none in Jerome and Buhl area to 0.67 inch at Montpelier. High winds caused limited damage to early-sown cereal crops. Topsoils drying rapidly. Tillage and seeding operations full swing. Lower elevation ranges greening rapidly.

**ILLINOIS:** Precipitation mostly less than 0.10 inch except to 0.50 inch east-central and extreme south. Temperatures averaged 2° to 3° below normal. Oat seeding 40% complete, compared to 15% last year. Plowing for corn and soybeans 2/3 completed. Winter wheat good to excellent. Pastures good, supplying 1/5 roughage requirement. Average 4.5 days suitable fieldwork. Main activities, applying fertilizer, plowing, seeding oats, diskings, livestock care, machinery maintenance.

**INDIANA:** Cool week. Temperatures averaged 38° to 50° and 1° to 5° below normal. Precipitation Thursday and Friday of 0.30 to 0.80 inch. Soil temperatures low 30's at 4-inch depth in extreme north, high 30's in central, low 40's in south. Four days suitable fieldwork. Topsoil moisture mostly adequate to surplus. Subsoil moisture adequate. Fieldwork 1 day ahead usual. Plowing corn and soybean land 35% done, 10 days ahead average, much of it done last fall. Oats 20% seeded, 8 days ahead last year. Wheat 3 inches high, same last year. Pastures poor to fair and providing 10% roughage feed.

**IOWA:** Temperatures warmed into 60's and 70's early week turning much colder and windy with light snow 1st. Snow cover nearly gone in Iowa. Streams generally high to full. Less than 2 days suitable for fieldwork, mostly southern half State. Some reports indicated ground frost present northern counties. Oats 10% planted, generally southern counties, about 5% last year; 5 year average 25% planted. Plowing 45% completed. Spring plowing started. Last year 45%, 5-year average 50% plowed. Preliminary reports indicate 5% legumes winter killed. Principal farm activities: Manure

hauling, fertilizing, livestock care, and machinery repair. Topsoil moisture 73% adequate, 27% surplus. Subsoil moisture 80% adequate and 20% surplus.

**KANSAS:** Intense storm center northern plains at midweek caused very strong wind in Kansas generally 40 to 55 m.p.h. with strong gusts 31st and April 1. Considerable blowing dust those days north-central and west. No significant precipitation. Weekly mean temperatures much above seasonal northwest, near normal elsewhere. Maxima in 90's locally southwestern Kansas 31st. Seeding oats and barley progressed well. Oats 59% seeded, compared 78% last year and average 61%. Spring barley 55% seeded, compared 49% last year and average 52%. Sugar beet planting underway and some corn planted. Wheat growth responded to warmer weather. Winds reduced moisture western areas and dry spots appeared some fields. Soil borne mosaic infestation evident central and eastern counties, a few greenbugs and some brown mites. Considerable wheat stooling, some jointing. Some calves bought for pasturing and cattle moved to feedlots. Some spring lambs sold, but shearing progress slow.

**KENTUCKY:** Temperatures averaged about 1° to 3° below normal. Precipitation light to moderate except heavy portions of south-central and southwest. Range 0.20 inch to 1.80 inches. About 1/2 the days near or above seasonable and 1/2 on the cool side. Light to heavy rain and widely scattered thunderstorms on 1st, and a few sprinkles on 2d, other days mostly sunny. Farmwork limited to slightly over 4 days. Plowing 1/2 completed. Tobacco plant bed seeding 77% complete, with 2% having plants up. Cattle now getting 1/4 roughage from slowly improving pastures. Livestock on winter feed on 80% farms. Hay supply adequate, 16% still on hand. Winter damage to grain and cover crops light.

**LOUISIANA:** Cooler than normal temperatures statewide for 3d straight week. Departures, 4° to 7°. Light freezes or frost all sections early and late in week. Temperature extremes: 78° Jennings and Lake Charles Thursday; 29° Ashland Tuesday. Rain southeast last Monday and statewide Thursday with cold fronts. Weekly totals light to moderate most areas less than 0.30 inches many places but locally more than 2.00 inches southeast. Fieldwork continued lag in Delta, but fair to good progress made most other areas. Land preparation active northwest where start in cotton planting was made. Considerable rice seeded southwest; 20% to 25% crop planted. Corn planting 25% complete. Seed germination and early growth slow owing unusually cool weather. Sugarcane growing slowly. Bedding sweet potatoes finished in northeast some field transplanting south. Peach prospects good. Strawberry shipments and quality improved. Native grass growing slowly, supply pasture feed average. Livestock good.

**MARYLAND AND DELAWARE:** Temperatures averaged normal to 2° below normal. Extremes mostly mid-60's to mid-70's, 20's except 5° to 15° in Garrett County. Precipitation generally 0.25 to 0.50 inch but ranging from 0.10 to 1.00 inch. March 1971 temperature averaged below normal while precipitation totaled also below normal. Snowfall for March heavy in west, near normal in southern areas, but elsewhere mostly below normal. Grain, pasture, and hay crops generally good but development slow. Fields starting to green north, some rye ready to pasture south. Plowing continues active as fields dry. Tobacco seedbed germination slow. Farmers busy cleaning barns and checking out equipment.

**MICHIGAN:** Rapid fluctuations in temperatures occurred in Michigan past week. Cool early in week, warmed into 50's and 60's by midweek and cooled sharply as week ended. Several stations reported recordbreaking low temperatures Sunday and Monday mornings. Temperatures averaged 3° to 8° below normal greatest departures in central and south-central Lower Michigan. Detroit area received a little rain, otherwise most precipitation fell as snow with total amounts of moisture averaging from 0.10 to 0.30 inch. One exception: Calumet in Upper Peninsula received over 1.00 of moisture adding nearly 10 inches to their snow depth.

**MINNESOTA:** Temperatures averaged from 1° below normal in the southwest to 6° below normal in northeast. Precipitation, rain and snow, occurred on April 1 and 2. There was a 14-inch snowfall at Ely in northeast. Water content near 1.00 inch in northeast to generally less than 0.10 inch across rest of State. Little or no snow cover across State except north-central, northeast, and the northern part of central, and east-central district which has about 20-inch snow depth. Virtually no fieldwork started. Subsoil moisture adequate most areas. Livestock good condition with adequate feed supply.

**MISSISSIPPI:** Rain March 28 then fair until rain began Thursday afternoon and ended Friday morning. Most stations had weekly totals over 1.00 inch except in sections of northwest Mississippi. Weekly temperature averages continued below normal and ranged from near 4° below normal in coastal area to over 8° below normal in parts or northern Mississippi. Weekend: Fair and continued cool. Soil moisture adequate to surplus south, elsewhere mostly surplus. Days suitable for fieldwork 2. Winter wheat and oats fair to mostly good condition; with 34% wheat and 31% oats jointing. Spring plowing 24% completed. Irish potatoes, peaches, pastures and livestock mostly fair to good condition. Truck crops fair.

**MISSOURI:** Week started warm and dry and ended with snowstorm in Ozarks. Temperatures, warmed into 70's Tuesday and Wednesday only, reached 40's and 50's on weekend. Precipitation sparse with only Ozarks and Bootheel reporting measurable precipitation. Snowstorm on Sunday left 2 to 5 inches of snow in Ozarks. Average 5 days suitable for fieldwork. Plowing 50% completed. Soil moisture adequate most parts, but dry southwest portion. Pastures fair, wheat mostly fair condition with Bootheel area reporting good stand.

**MONTANA:** Cool midweek, but temperatures averaged about 3° warmer than normal. Precipitation mostly light, a few places had none. Substantial amounts central and south-central mountains added to already heavy mountain snowpacks. Warmest 74° Broadus March 30, coldest 1° West Yellowstone April 1. Top- and subsoil moisture supply good. Fieldwork just getting started. One half calving completed, lambing 40% complete and 55% sheep sheared. Ninety-five percent range cattle and sheep receiving supplemental feed. Wind damage winter wheat light, but 10% State's winter wheat received moderate damage. Slightly over half winter wheat lying dormant.

**NEBRASKA:** Dry and windy, very warm through Wednesday. Cold remainder of week. Spring fieldwork started some areas, but very little plowing or disking. Strong winds caused little soil erosion on unprotected lighter soils in portions of Panhandle, central, and southwest. Winter wheat,

rye, and cool season grasses greening slowly. Some scours young calves and pigs, but no abnormal losses. Feedlots drying, but remain muddy.

**NEVADA:** Temperatures near normal all stations. Very light precipitation in northwest, light in northeast. None in south. Snow melting in mountains. Winter grain appears good condition. Seedbed preparation for spring-planted crops continues. Livestock fair to good with death losses light, but losses baby calves on increase due coyotes. Calving continues full swing. Stockwater and seed supplies adequate. Range and pastures turning green. Green chopping alfalfa hay started extreme southern areas.

**NEW ENGLAND:** Mild week with temperatures mostly 1° to 3° above normal except in northwestern portion where means were 1° to 3° below normal. Precipitation April 2 and 3 ended a 2-week dry spell. Totals variable but mostly 0.20 to 0.60 inch. Snow cover decreased rapidly, with coastal areas and low elevations in south mostly bare. Snow cover substantial in higher elevations as far south as northwestern Connecticut. Snow depths in north generally 1 to 4 feet but locally deeper. Good skiing still available many slopes. Maple sugaring season about 2 weeks late. Only sheltered areas reporting good flows.

**NEW JERSEY:** Second consecutive week with cool weather. Temperatures generally averaged from 1° to 4° below normal. Rain late Friday averaged 0.30 inch over most of State. Totals varied from 0.10 inch to 0.60 inch with greatest amounts in south-central areas. Topsoils became more workable resulting in increased preparation and planting rate. Warm weather needed for good germination and growth. Lime and fertilizer are being applied to pastures. Pastures and cover crops beginning to make good growth.

**NEW MEXICO:** Continued dry with only very light showers in northeast on weekend. Cooler with temperatures averaging near normal except 5° above normal in southwest. Warmest Tuesday in west and Wednesday in east. Coolest Friday. Top-subsoil moisture generally short to very short statewide. Critical need for moisture. Fall-sown dryland crops fair to poor; irrigated fair to good. Light to heavy insect damage on dryland acreage. Preirrigation cotton acreages. Some early planting of cotton. Spring vegetables good. Alfalfa showing good growth-irrigating. Livestock fair to good. Calving and lambing progressing well. Range conditions vary from poor to fair.

**NEW YORK:** Mild temperatures midperiod, otherwise cold week. Maximums low 60's coastal and western 1/3 on 1st and 2d with low to mid-50's southern interior and mid-40's northern valleys. Coldest minimums teens to low-20's on 31st western half shifting to eastern half on 1st with low 30's on Long Island. Little Valley in southwest, 6° on 31st. Precipitation limited to rain on 1st and mixture of rain and snow showers on 2d. Heaviest totals 0.30 to 0.60 inch eastern 1/3, decreasing to 0.20 inch Long Island and 0.10 to 0.20 inch western half. Third week of below normal precipitation west-central and central sections. Snow depths late week 10 to 20 inches or more upper Hudson Valley and northern half with 6 to 12 inches eastern plateau. Long Island had very little snow cover entire winter.

**NORTH CAROLINA:** Temperatures averaged below normal. Highest in 70's and lowest in 20's most stations.

Some daily local record lows equaled or broken over weekend. Rain 29th and showers 2d and 3d with totals mostly 0.50 to 1.00 inch. Soil moisture generally adequate with little change from previous week. Small grains and pastures mostly good and improving. Tobacco beds improving and mostly good. Transplanting beginning Border Belt. Irish potato condition good. Hay and feed grain supplies mostly adequate. Land preparation main farming activity. Vegetable planting gaining momentum. Labor supply and demand generally in balance.

**NORTH DAKOTA:** Temperatures averaged 4° below normal northeast to 3° above normal northwest. Precipitation mostly 0.10 inch or less. Midweek snow and rain showers some areas accompanied by cooler temperatures caused stress among livestock, particularly new calves and lambs. Farmers repaired machinery, cleaned seed, attended meetings and farm sales, and cared for young livestock.

**OHIO:** Cold and very windy. Hourly wind speeds of 20 to 35 m.p.h. common 31st through 3d. Daily mean temperature generally above normal only on 28th and 31st. Record or near-record low temperature occurred over north on 5th. Rain totaled 0.30 to 0.50 inch western 1/3 on 1st and generally 0.10 to 0.30 inch elsewhere. Snow flurries northern half on 3d. Days favorable for fieldwork 4. Soil moisture supply mostly adequate. Year ago mostly surplus. Plowing for corn and soybeans 55% completed, last year 45% average 35%. Oat seeding 15% completed, last year 5% normal 20%. Potato planting about 5% completed, same as last year, usually near 10%. Sugar beet planting less than 5%, same as year ago. Tobacco beds 30% sown, last year 20%. Wheat mostly good. Pasture and hay crops fair to good.

**OKLAHOMA:** Weekly precipitation averaged 0.12 inch northeast, 0.25 inch east-central, and 0.09 inch southeast. Continued very dry with no rain other areas. Several days of strong drying winds added to the severity of drought conditions in State. Temperatures northwest half of State averaged 1° to 5° above normal and 1° to 2° below normal southeast. Extremes: 96° and 21°. Wheat, oats and barley prospects continued to decline statewide as dry weather remains. Wheat 86% now reported no better than poor to fair, compared with 68% week earlier. Seedbed preparation for irrigated row crops quite active, but fieldwork for dryland crops slackened due dry weather. Surface subsoil moisture now 94% and 66% short respectively. Native pastures slow starting, particularly over parched western half State.

**OREGON:** Light to moderate rains first 5 days of week varied by 2 dry periods with warmer afternoons and scattered showers at close of week. Temperatures averaged mostly 1° to 3° below normal. Minima 15° to 25° east of Cascades; 28° to 33° western valleys, 32° to 40° coast. Maxima 53° to 71°. Precipitation totaled mostly 0.05 to 0.20 inch east of Cascades and southwestern valleys, 0.50 to 1.20 inches rest of west side except 1.60 to 3.00 inches northern coast. Warm weather end of week increased field activity. Plowing, fertilizing, seeding spring grains, orchard pruning, and spraying continue. Hay supplies short. Livestock continue good.

**PENNSYLVANIA:** Cool dry week. Warmup midweek, otherwise cool. Temperatures averaged 3° below normal. High was 70° at Philadelphia on 2d and low was 11° at Bradford on 31st. Cold front moved through State Friday preceded by light rain showers most areas. Precipitation totals were in the 0.20 to 0.40 inch range in northeast and north-

west corner with generally less than 0.10 inch elsewhere. Seeding Pennsylvania seed leaf tobacco seedbeds made good progress. Tapping of maple trees continues. Limited progress in fieldwork.

**PUERTO RICO:** Little or no rain early in week with warmer-than-normal temperatures. Heavy showers and gusty surface winds islandwide late in week from cold frontal passage. Average weekly rainfall 2.60 inches or 1.65 inches above normal. Highest 24-hour total, 4.45 inches. Crop moisture conditions near normal islandwide with much improvement southern divisions where still more rain needed to recharge subsoil layers. Temperatures averaged 76° on coast and 71°. Highest max temperature, 90°; lowest minimum 49°. Sugarcane harvesting and transporting operations progressed well in fair weather until weekend when rains delayed field operations. Young plants and ratoons much improved by rainfall. Coffee plantations reported delay in fieldwork towards weekend due heavy rain showers. Tobacco plants improved from recent rains and good curing progress drier zones. Pastures good to excellent islandwide with much improvement southern cattle zones due rain showers. Minor crops zones continued seeding and fertilizing operations with no serious delays from rain.

**SOUTH CAROLINA:** Midweek rainfall was 0.50 to 0.75 inch northern part of State, 0.25 to 0.50 in midlands, and less than 0.25 inch along the coast. Rather cold with most lows in the 30's all week. Temperatures averaged 5° below normal in the north and 7° below normal in the south. Soil moisture surplus all areas. Land preparation and planting delayed by excessive soil moisture. Small percent of tobacco acreage transplanted. Some transplanting delayed because land not prepared. Some areas short on plants but overall supply believed adequate. Corn 10% planted, cotton planting just underway. Small grains and pastures fair to good condition. Most grains jointed and some headed. Peaches fair to good condition - cold weather damage undetermined. Trees past full bloom in Ridge area, in bloom stage Piedmont. Early-planted cucumbers damaged by weather conditions. Tomato plants show signs of weather and wind damage. Watermelon planting 50% complete, peanut planting underway.

**SOUTH DAKOTA:** Weekly temperatures averaged from 4° below normal in north to 2° above normal in southwest. Extremes ranged from 12° at Watertown on 4th to 80° at Oelrichs on 30th. Precipitation fell as light rain or snow mostly near end of week with totals of 0.20 inch or less in lower elevations but to over 0.30 inch in northern Black Hills. Mild weather permitted limited field work earliest areas, mainly fertilizer spreading and some seedbed preparations. Snow cover gone, except at highest elevations. Fieldwork expected to gain momentum within next 10 days. Topsoil moisture adequate. Calving and lambing proceeded under favorable conditions.

**TENNESSEE:** Week began cold, turned mild at midweek, then colder and ended with temperatures near to slightly above normal. Showers at beginning and Friday. Totals from 0.75 inch to 1.25 inches, heaviest in mid-State area. Warm temperatures needed to help complete spring plowing. Most soils too soggy to plow; however, some plowing done upland areas. Most farmers having to confine activities to routine chores. Tobacco bed seeding 85% complete. Few farmers reported planting corn. Small grains fair condition. Pastures showing rapid improvement. Livestock fair, some still on

feed. Days suitable for field work 2.6. Soil moisture indicated as surplus by 59%, adequate by 39% and short by 2% of reporters.

**TEXAS:** Low pressure center in western gulf produced good rains along southern coast and in lower valley Sunday. Several stations reported 2.00 inches or more with 2.83 inches at Edinburg. Little or no rain fell elsewhere. Temperatures were near the seasonal average. Drought conditions prevail over most of State and continue to cause much concern. Planting south-central and southward falling further behind schedule. Rainfall in Lower Valley and Coastal Bend should provide some relief in these areas. Planting East Texas, Blacklands, Cross Timbers continue ahead last years schedule, but has slowed as soil moisture becomes more scarce. Dryland flax, oat, and wheat crop prospects poor. Cattlemen still feeding hay and supplements, hauling water, culling herds. Main activities, preplant activities, planting of spring crops, tending livestock. Percent planted to date: - cotton 8, 9 year ago; - sorghum 26, 22 year ago; -- corn 39, 31 year ago; - rice 57, 16 year ago, - peanuts 3, 3 year ago. Onion harvest active Lower Rio Grande Valley. Cabbage, carrot harvest active Lower Valley. South Texas spring vegetables mostly good progress, under frequent irrigation. Cabbage, carrots, lettuce, spinach harvest continues Winter Garden, but declining. East Texas watermelon, tomato planting continues but droughty conditions unfavorable. High Plains potato, onion planting continues. Citrus harvest continues Lower Valley.

**UTAH:** Few isolated light showers northwest portion early in period; otherwise little or no precipitation. Accumulated amounts generally less than 0.10 inch. Temperatures averaged near to a little above normal. Accumulated growing degree days since March 1st running well ahead of a year ago. Spring plowing and planting proceeding rapidly all farming areas. Fields dry and easy to work. Range lambing full swing. Calving well along. Irrigation canals being cleared. Water will be turned into ditches next week many areas. Care and feeding dairy herds, poultry flocks, cattle, and sheep on winter ranges, valley farms and in feed lots continues major activity.

**VIRGINIA:** Temperatures variable, ranging about normal. Rain at beginning and on Friday. Totals generally less than 0.25 inch except higher in extreme south. Fieldwork picked up as fields dried out from late March snow and slightly ahead last year. Pastures good for this date. Oats, hay, and pasture seeding continued. Peaches full bloom

east and most open Burkeville area. Crozet section, Elbertas 10% open; 7 to 10 days late. Tobacco plant beds doing well. Eastern shore Irish potato planting done. Cabbage damaged by wind and sand. Bedding sweet potatoes, spinach harvest started.

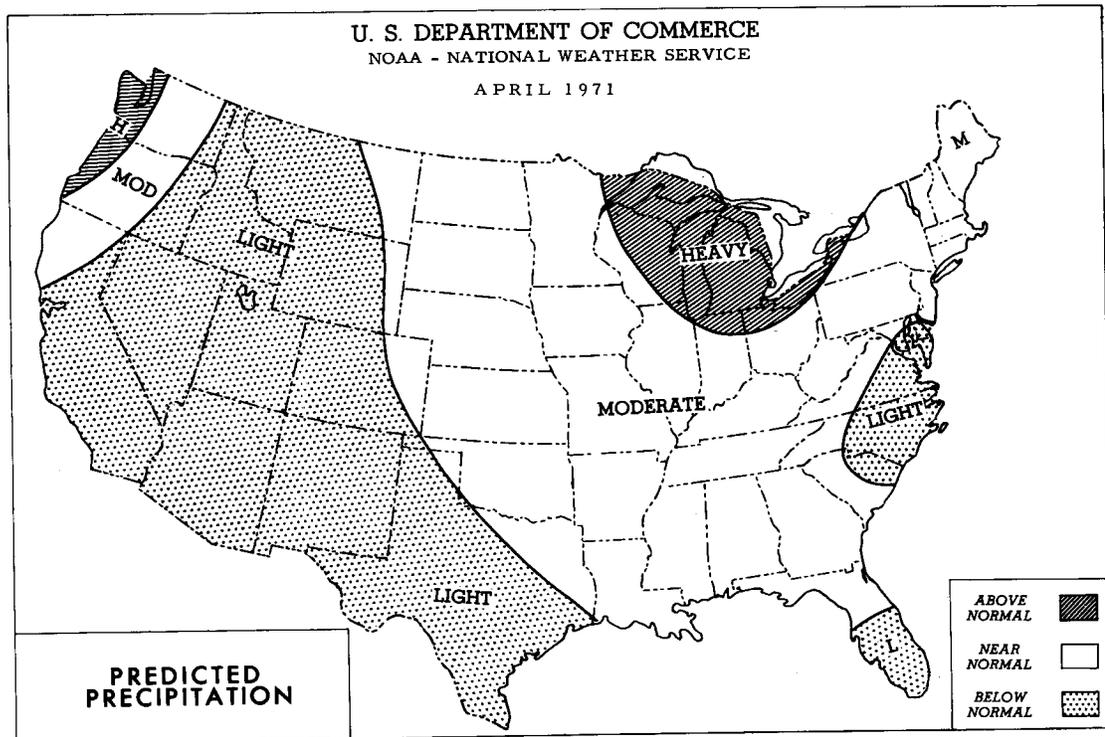
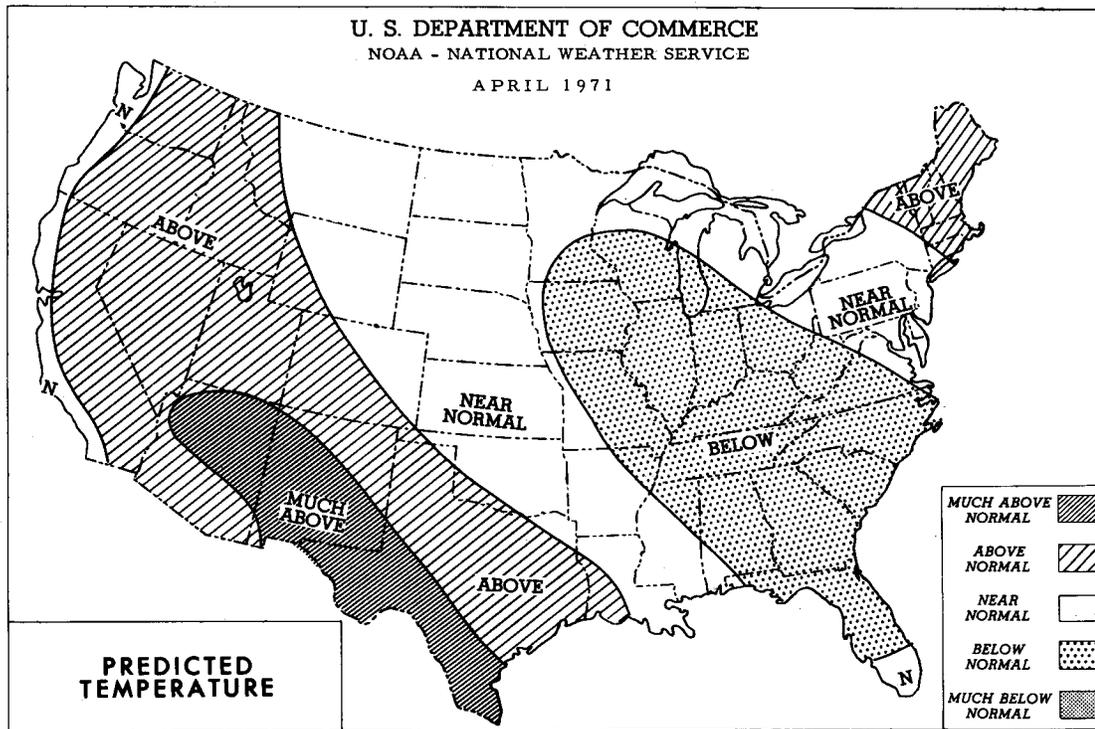
**WASHINGTON:** West of Cascades: Cool and wet until end of week. Rainfall amounts 1.00 to 2.00 inches interior valleys, 3.00 inches coastal area. Frost 1 or more nights colder agricultural areas. Planting spring crops and other fieldwork delayed by weather. Growth pastures slow. Planting strawberries and raspberries continues. East of Cascades: average temperatures 1° to 3° below normal. Below freezing 1 or more nights with 23° to 26° reported colder localities. Precipitation limited to few scattered light showers. Pruning continues, northern orchard areas, dormant sprays being applied. Yakima Valley apricots in bloom, peaches starting to show color. No frost damage to date. Some orchard heating being used. Planting potatoes, sugar beets, and spring cereals continues. Most grain fields developing well, but slowly. Some spotty stands. Sheep shearing in progress.

**WEST VIRGINIA:** Generally cold and windy week with a few snow showers March 30 and light rain April 2. Some temperatures in 70's April 1 lower elevations. Improved weather conditions permitted some fieldwork. Pastures continue to greenup. Soil moisture fully adequate to support good growth of growing crops.

**WISCONSIN:** Several mild days first half of week. Back to cold winterlike weather remainder of period. Extremes 75° and -5°. Light snow and snow flurries Friday. Snow cover reduced considerably during mild days but north-facing slopes and wooded areas of north still have 2 to 3 feet of dense snow. Farmers getting ready for spring planting as soils are drying

**WYOMING:** Scattered light to moderate snows statewide. Maxima were mostly high 40's to mid-60's west of Divide, 60's to mid-70's east. Minima were mostly -5° to 15° west of Divide. 6° to 23° east. Frost is out of plains except portions of northeast Wyoming. Temperature extremes: 77° at Wheatland and -6° at Bondurant. Calving and lambing continue over most of State while seedbed preparations have begun irrigated areas. Less than 5% spring oats and barley planted. Soil moisture supplies adequate and prospects for new feed growth on ranges and pastures good to excellent. Calf and lamb losses light to normal most areas, although some problems encountered isolated spots due to very wet spring snows.

**AVERAGE MONTHLY WEATHER OUTLOOK**



The above prognostic charts show the expected categories of average temperature and total precipitation for the period indicated. They were extracted from the Extended Forecast Division's publication "Average Monthly Weather Outlook" which contains additional information necessary for complete interpretation.

Heating Degree Days (Base 65° F.)

MARCH 1971

ALA. Birmingham . . . . .	500	MAINE, Caribou . . . . .	1244	OKLA. Okla. City . . . . .	492
Mobile . . . . .	191	Portland . . . . .	1028	Tulsa . . . . .	463
Montgomery . . . . .	376	MD. Baltimore . . . . .	712	OREG. Astoria . . . . .	703
ALASKA, Anchorage . . . . .		MASS. Boston . . . . .	868	Burns . . . . .	973
Barrow . . . . .		Chatham . . . . .	901	Medford . . . . .	617
Fairbanks . . . . .		MICH. Alpena . . . . .	1269	Pendleton . . . . .	755
Juneau . . . . .		Detroit . . . . .	1015	Portland . . . . .	653
Nome . . . . .		Flint . . . . .	1088	Salem . . . . .	706
ARIZ. Flagstaff . . . . .	862	Grand Rapids . . . . .	1110	PA. Allentown . . . . .	900
Phoenix . . . . .	123	Houghton Lake . . . . .	1282	Erie . . . . .	1078
Tucson . . . . .	200	Lansing . . . . .	1069	Harrisburg . . . . .	812
Winslow . . . . .	581	Marquette . . . . .	1189	Philadelphia . . . . .	746
Yuma . . . . .	105	S. Ste. Marie . . . . .	1380	Pittsburgh . . . . .	949
ARK. Fort Smith . . . . .	495	MINN. Duluth . . . . .	1332	Scranton . . . . .	985
Little Rock . . . . .	470	Internatl Falls . . . . .	1352	R. I. Providence . . . . .	868
CALIF. Bakersfield . . . . .	225	Minneapolis . . . . .	1139	S. C. Charleston . . . . .	404
Eureka . . . . .	548	Rochester . . . . .	1195	Columbia . . . . .	462
Fresno . . . . .	322	St. Cloud . . . . .	1237	Greenville . . . . .	572
Los Angeles . . . . .	154	MISS. Jackson . . . . .	394	S. DAK. Aberdeen . . . . .	1034
Red Bluff . . . . .	403	Meridian . . . . .	408	Huron . . . . .	1127
Stockton . . . . .	363	Vicksburg . . . . .	---	Rapid City . . . . .	996
San Diego . . . . .	215	MO. Columbia . . . . .	711	Sioux Falls . . . . .	1042
San Francisco . . . . .	394	Kansas City . . . . .	659	TENN. Chattanooga . . . . .	607
COLO. Denver . . . . .	817	St. Louis . . . . .	682	Knoxville . . . . .	596
Grand Junction . . . . .	735	Springfield . . . . .	642	Memphis . . . . .	509
Pueblo . . . . .	715	MONT. Billings . . . . .	976	Nashville . . . . .	624
CONN. Bridgeport . . . . .	825	Glasgow . . . . .	1245	TEX. Abilene . . . . .	326
Hartford . . . . .	911	Great Falls . . . . .	1031	Amarillo . . . . .	524
D.C. Washington . . . . .	670	Havre . . . . .	1074	Austin . . . . .	171
FLA. Apalachicola . . . . .	229	Helena . . . . .	1120	Beaumont . . . . .	160
Ft. Myers . . . . .	63	Kalispell . . . . .	986	Brownsville . . . . .	38
Jacksonville . . . . .	259	Miles City . . . . .	1031	Corpus Christi . . . . .	64
Key West . . . . .	4	Missoula . . . . .	908	Dallas . . . . .	256
Lakeland . . . . .	115	NEBR. Grand Island . . . . .	890	Del Rio . . . . .	107
Miami . . . . .	31	Lincoln . . . . .	847	El Paso . . . . .	252
Orlando . . . . .	89	Norfolk . . . . .	967	Fort Worth . . . . .	307
Pensacola . . . . .	---	North Platte . . . . .	974	Galveston . . . . .	143
Tallahassee . . . . .	339	Omaha . . . . .	941	Houston . . . . .	219
Tampa . . . . .	139	Valentine . . . . .	1002	Lubbock . . . . .	438
GA. Atlanta . . . . .	533	NEV. Ely . . . . .	933	Midland . . . . .	297
Augusta . . . . .	465	Las Vegas . . . . .	306	San Angelo . . . . .	211
Macon . . . . .	387	Reno . . . . .	736	San Antonio . . . . .	134
Savannah . . . . .	338	Winnemucca . . . . .	833	Victoria . . . . .	119
IDAHO, Boise . . . . .	762	N. H. Concord . . . . .	1064	Waco . . . . .	188
Lewiston . . . . .	740	N. J. Atlantic City . . . . .	798	Wichita Falls . . . . .	395
Pocatello . . . . .	997	Trenton . . . . .	759	UTAH, Blanding . . . . .	738
ILL. Cairo . . . . .	539	N. MEX. Albuquerque . . . . .	533	Salt Lake City . . . . .	738
Chicago . . . . .	903	Roswell . . . . .	384	VT. Burlington . . . . .	1263
Moline . . . . .	993	N. Y. Albany . . . . .	1059	VA. Lynchburg . . . . .	673
Peoria . . . . .	906	Binghamton . . . . .	1130	Norfolk . . . . .	555
Rockford . . . . .	1008	Buffalo . . . . .	1085	Richmond . . . . .	627
Springfield . . . . .	793	New York . . . . .	774	Roanoke . . . . .	657
IND. Evansville . . . . .	707	Rochester . . . . .	1121	WASH. Colville . . . . .	947
Fort Wayne . . . . .	945	Syracuse . . . . .	1040	Omak . . . . .	
Indianapolis . . . . .	852	N. C. Asheville . . . . .	672	Quillayute . . . . .	787
South Bend . . . . .	959	Charlotte . . . . .	574	Seattle-Tacoma . . . . .	728
IOWA, Burlington . . . . .	920	Greensboro . . . . .	653	Spokane . . . . .	918
Des Moines . . . . .	915	Hatteras . . . . .	476	Walla Walla . . . . .	653
Dubuque . . . . .	1095	Raleigh . . . . .	611	Yakima . . . . .	813
Sioux City . . . . .	918	Wilmington . . . . .	450	W. VA. Beckley . . . . .	889
KANS. Concordia . . . . .	787	N. DAK. Bismarck . . . . .	1134	Charleston . . . . .	778
Dodge City . . . . .	701	Fargo . . . . .	1153	Huntington . . . . .	711
Goodland . . . . .	777	Williston . . . . .	1135	Parkersburg . . . . .	787
Topeka . . . . .	734	OHIO, Akron-Canton . . . . .	946	WIS. Green Bay . . . . .	1206
Wichita . . . . .	643	Cincinnati . . . . .	756	Madison . . . . .	1124
KY. Lexington . . . . .	759	Cleveland . . . . .	1031	Milwaukee . . . . .	1122
Louisville . . . . .	707	Columbus . . . . .	871	WYO. Casper . . . . .	1024
LA. Baton Rouge . . . . .	250	Dayton . . . . .	836	Cheyenne . . . . .	1007
Lake Charles . . . . .	204	Toledo . . . . .	987	Lander . . . . .	997
New Orleans . . . . .	216	Youngstown . . . . .	1070	Sheridan . . . . .	968
Shreveport . . . . .	316				

Preliminary reports from airport locations, except those marked U for urban and R for rural.  
\*Estimated.

MORE ON GROWING SEASON LENGTH

In last week's Bulletin (page 16) we discussed the use of freeze probability data and its application in determining the mean number of growing degree days available for a given crop season. Basic laws of probability were used to calculate the probability that a growing season (frost-free period) would last from a given freeze probability (risk) date in spring to a given freeze risk date in fall. We saw, for example, that the probability of a growing season lasting from the date of 50% freeze risk in spring to date of 50% freeze probability in fall was 25%.

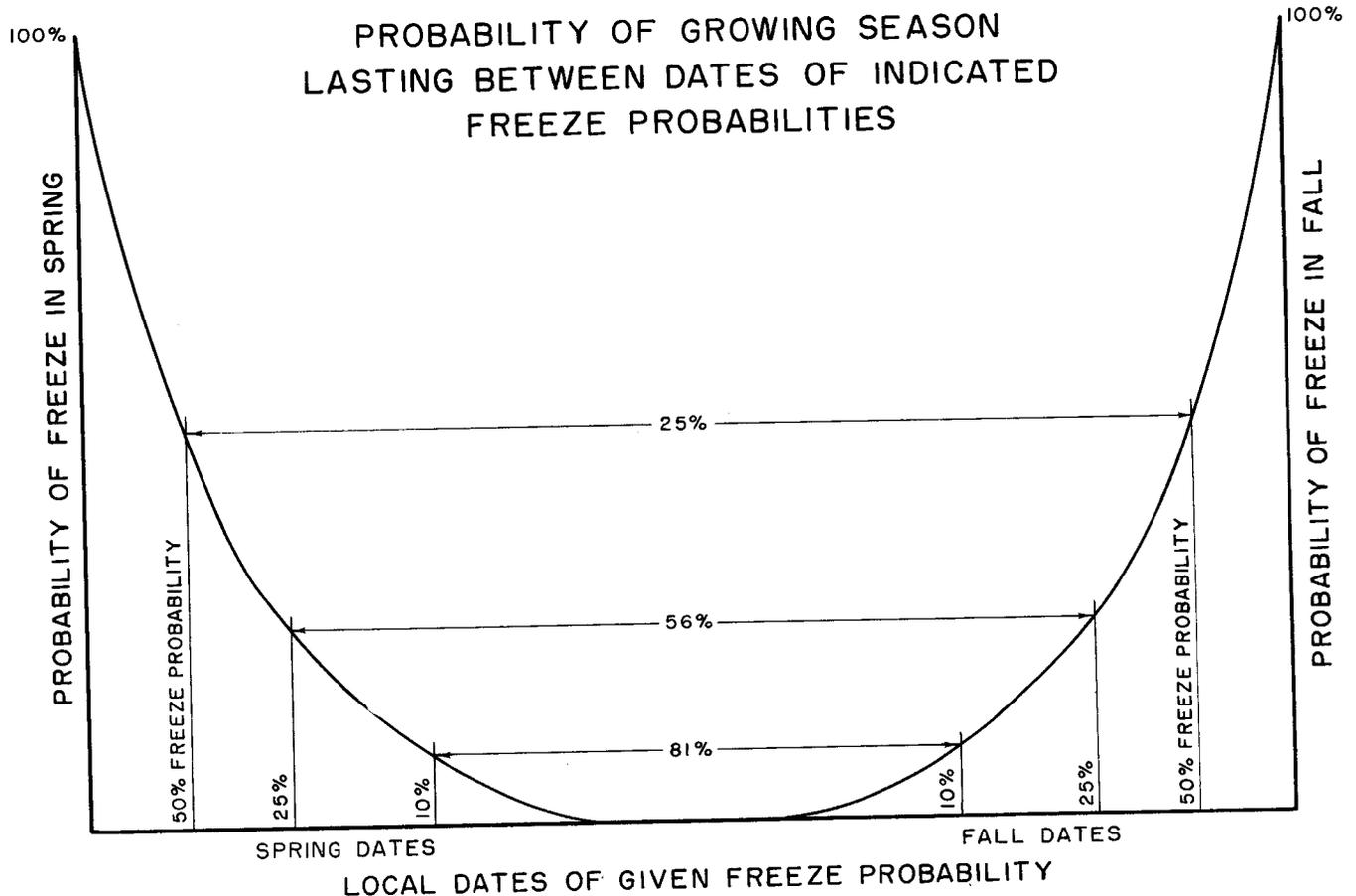
In general, the probability of a frost-free period lasting between given freeze probability dates is equal to the product of the probabilities of no frost occurring after the given spring date or before the given fall date. Thus, there is an 81% probability that no frost will occur between dates of 10% freeze risk in spring and fall. (Probability of no frost after 10% date in spring or before 10% date in fall is 90%;  $.90 \times .90 = .81$  or 81%).

The same procedure applies, of course, in case one can accept a different risk of freeze

in the fall than in spring. Take corn as an example. If seedlings are well out of the ground they can be killed by a late-spring freeze; in fall, however, a freeze may only dictate more costly drying or storage methods. If we accept a 10% risk of freeze after emergence and a 70% risk of freeze before a given fall date, then the corresponding no freeze probabilities are 90% and 30%. The likelihood of these two conditions occurring in the same season, then, is  $0.90 \times 0.30$ , or 0.27, which we speak of as a 27% chance of the entire period between selected dates being freeze-free.

The figure below is presented to more clearly show the relationship between degree of frost risk and probable length of the growing season. Operationally, the chart shows that as a grower assumes a greater risk of frost in the spring and/or fall, there is a decreased probability of a frost-free period occurring between dates of the assumed frost risk.

J. J. Rahn  
G. L. Barger



## CROP MOISTURE INDEX

The Meteorological Drought Index was designed to evaluate the scope, severity, and frequency of prolonged periods of abnormally dry weather. For this purpose it works reasonably well. However, since some people have been trying to interpret it strictly as a measure of the current status of agricultural drought; i.e., as a measure of the effects of abnormally dry weather on crops, a separate procedure has been developed that responds rapidly to changes in the soil moisture situation and takes into account only those moisture aspects which affect vegetation and field operations. Except under wet conditions, this Crop Moisture Index stands at zero at the start of the growing season and returns to near zero at the end of the growing season.

When viewed in any detail, the agricultural drought problem appears hopelessly complicated. Local differences in soils, types of crops, rooting depths, stages of crop development, and precipitation amounts seem to preclude any meteorological approach to the development of useful information. Actually, if one's interests require a knowledge of detailed local variations in crop responses, available meteorological information is completely inadequate, to say nothing of the lack of the other types of necessary information. However, if one looks at the problem from a different viewpoint, it doesn't appear nearly so hopeless.

If one's interests require answers to broad questions such as, What is the crop moisture situation in the soybean producing regions? the meteorological approach can provide useful information. In such cases there is no interest in or need for details as to the situation in individual fields. The Crop Moisture Index was designed to provide information in response to the broad-scale general questions rather than the localized questions.

In its simplest terms agricultural drought is a transpiration deficit. However, if one uses computed potential evapotranspiration as an estimate of the moisture need, the subhumid and semiarid regions turn out to have evapotranspiration deficits much of the time during summer. Maps drawn on the basis of such computations reflect climate as much or more than they show weather. Maps become more meaningful if one bases them on the abnormal evapotranspiration deficit.

The computer printouts for the Palmer Drought Index provide a measure of the weekly abnormal evapotranspiration deficit for each climatological division. This is a computed value, an estimate of the amount by which the actual weekly evapotranspiration falls short of the "expected" weekly evapotranspiration. The actual evapotranspiration takes account of the actual temperature and precipitation during the week as well as the computed amount of soil moisture, both topsoil and subsoil, existing at the start of the week. The "expected" evapotranspiration is an adjusted normal value; i.e., the long-term mean value is adjusted upward or downward depending on the departure of the week's temperature from normal. Successive weekly values of this computed abnormal evapotranspiration deficit have been combined into a measure of the cumulative severity of agricultural drought. In other words, as the accumulated evapotranspiration deficit gradually increases from week to week during dry weather, the crop moisture situation becomes progressively more serious. The map with its legend, page 14, translates the computed evapotranspiration anomaly index into a picture of the scope and severity of the agricultural drought situation.

Of course, the weather is sometimes too wet for crops just as it is sometimes too dry. Too wet often means soils are too wet to permit timely field operations or rains have been so heavy that fields are actually flooded. In the weekly printouts of the Palmer Drought Index analysis, heavy rains in excess of the maximum weekly water use by the crops produce positive values of R (soil moisture recharge) until the soils reach field capacity, then any excess water shows up in the RO (runoff) term. These two measures of "excess" moisture have been combined into a wetness index which is always positive.

This Index (CMI) differs from the Palmer Drought Index (PDI) in that negative CMI values always mean that evapotranspiration has been abnormally deficient. But, negative PDI values imply negative abnormalities of either evapotranspiration, the amount of moisture stored in or added to the soil, or of runoff, or of a combination of all these types of moisture shortages. In other words, negative PDI values simply indicate that the weather has been abnormally dry, and do not specify the exact nature of the effects of the dry weather.

On the other hand, positive CMI values mean that either actual evapotranspiration exceeded the expected amount, or recent rainfall exceeded the moisture requirements of crops and the additional moisture was added to the soil or was regarded as runoff. However, positive PDI values indicate that the moisture supply either from current or antecedent rainfall exceeded the amount required to sustain the evapotranspiration, runoff and moisture storage which could be considered as normal and appropriate for the climate of the area. So, positive PDI values only indicate abnormally wet weather, and do not indicate which aspects of the moisture picture were affected. Thus, PDI values are based on all aspects of the moisture situation, but CMI values refer only to the crop moisture situation.

In addition, PDI values are highly dependent on antecedent moisture conditions, whereas CMI values are much less dependent on the past and therefore respond quickly to weekly rainfall or the lack of it. However, both Indexes do take account of the duration of anomalous periods of weather.

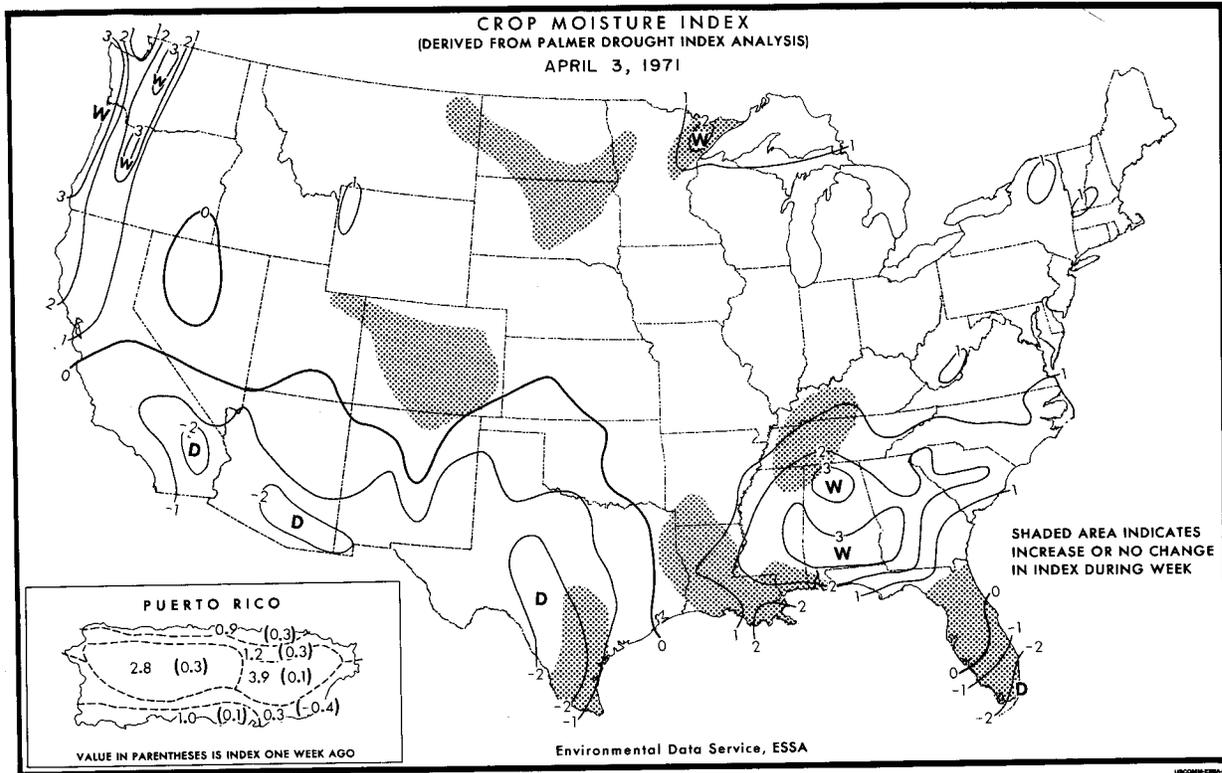
The map is drawn for a final crop moisture index which is the algebraic sum of the two numbers described above; viz., the evapotranspiration anomaly index and the wetness index. These values were computed in each of the 350 climatological divisions. The equations are so constructed that the final index responds rather quickly to abrupt changes of weather which alter the crop moisture situation from "wet" to "dry" or vice versa. The Crop Moisture Index is far from perfect, but it seems to represent macroscale crop moisture conditions fairly well in spite of the crude assumptions involved. As experience accumulates we may learn how to make improvements by some adjustments here and there.

The legend for the map is in two parts because an index value that occurs as an area becomes drier can also occur as the area becomes progressively wetter after having been very dry. The interpretation is different in the two cases. The map is shaded where conditions have changed little or became wetter during the past week; i.e., the index has not decreased during the week. Thus, the map shows both the trend and the status of the moisture situation. The one legend applies to the lines in

the unshaded areas, the other to the lines in shaded areas. The legends are to be applied primarily to growing rather than matured vegetation. Interpretation of the effects on crops and native vegetation must, therefore, take account of the stage of growth as well as the status and trend of moisture conditions. Centers of relative maximum and minimum index values are marked for easier recognition--W for wet and D for dry.

Special articles on the Crop Moisture Index and drought conditions, published in recent years in the Bulletin, are listed in the following issues:  
 1970 Index - December 28, 1970, issue.  
 1969 Index - September 28, 1970, issue.  
 1968 Index - September 7, 1970, issue.  
 1967 Index - August 31, 1970, issue.

W. C. Palmer



INDEX DECREASED DURING WEEK  
(Unshaded Areas)

INDEX INCREASED OR DID NOT CHANGE DURING WEEK  
(Shaded Areas)

INDEX

ABOVE 3.0 SOME DRYING, BUT STILL EXCESSIVELY WET.  
 2.0 to 3.0 MORE DRY WEATHER NEEDED, WORK DELAYED.  
 1.0 to 2.0 FAVORABLE, EXCEPT STILL TOO WET IN SPOTS.  
 0 to 1.0 FAVORABLE FOR NORMAL GROWTH AND FIELDWORK.  
 0 to -1.0 TOPSOIL MOISTURE SHORT, GERMINATION SLOW.  
 -1.0 to -2.0 ABNORMALLY DRY, PROSPECTS DETERIORATING.  
 -2.0 to -3.0 TOO DRY, YIELD PROSPECTS REDUCED.  
 -3.0 to -4.0 POTENTIAL YIELDS SEVERELY CUT BY DROUGHT.  
 BELOW -4.0 EXTREME DROUGHT, MOST CROPS ABOUT RUINED.

INDEX

ABOVE 3.0 EXCESSIVELY WET, SOME FIELDS FLOODED.  
 2.0 to 3.0 TOO WET, SOME STANDING WATER.  
 1.0 to 2.0 PROSPECTS ABOVE NORMAL, SOME FIELDS TOO WET.  
 0 to 1.0 MOISTURE ADEQUATE FOR PRESENT NORMAL NEEDS.  
 0 to -1.0 PROSPECTS IMPROVED, BUT RAIN STILL NEEDED.  
 -1.0 to -2.0 SOME IMPROVEMENT, BUT STILL TOO DRY.  
 -2.0 to -3.0 DROUGHT EASED, BUT STILL SERIOUS.  
 -3.0 to -4.0 DROUGHT STILL SEVERE, RAIN URGENTLY NEEDED.  
 BELOW -4.0 NOT ENOUGH RAIN, DROUGHT STILL EXTREME.

THE 1971 CROP MOISTURE SEASON:  
DROUGHT IN TEXAS AND FLORIDA

The first Crop Moisture Index (CMI) map of the 1971 growing season shows quite dry conditions in west-central Texas and in southern Florida. Both these regions have had drought conditions for almost a year - the abnormally dry Florida weather can be traced back to last June while the Texas dry spell began in mid-1970. During recent months the drought has intensified in both areas.

Winter (December through February) precipitation was less than 50% of normal in the Texas drought region, and generally 50% to 75% of normal in southern Florida. During March, most of central and western Texas had less than 25% normal rainfall, while under 50% normal precipitation fell in southern Florida. Dry conditions also extend westward from Texas

into southern California. Dryland crops in this region are in fair to poor condition, while livestock require continuous hauling of water. On the other hand, very wet soils are hampering fieldwork in parts of the southeast, as shown by the area on the accompanying map with CMI values above +2.

J. J. Rahn

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PROGRAM PROBLEMS PLAGUE  
GROWING DEGREE DAY DATA

Automation of human activities was dealt a severe setback over the weekend as an error (human?) in the growing degree day program led to the printout of erroneous station values. The problem will hopefully be located and corrected (by humans) in time to publish a map in next week's Bulletin...in next week's Bulletin...on next weeks Bolletun...onneckswea\*sBul#t#n...

No. 71632

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# FIRST CLASS MAIL



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This bulletin is available on subscription: Price per year \$5.00 domestic, foreign mailing \$1.25 extra; for period December through March \$1.50 domestic, foreign mailing 50 cents extra. Single issue 10 cents. Order from Superintendent of Documents, Government Printing Office, Washington, D.C., 20402. Released at 12 noon eastern local time Tuesday.

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Questions, comments, and suggestions concerning the content are desired; please send to the Editor at the above address.

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