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The Canadian Agriculture Weather Prognosticator

Volume IX, Issue XVIII | http://www.worldweather.cc | February 7, 2018

Ontario And Quebec

Plenty of snow is on the ground in Quebec where another wet spring could lead to flooding and a slow start to fieldwork. Warming is expected in the next week to ten days and that may help to melt some snow.

WORLD WEATHER ISSUES

- Argentina Drought Has Reached Its Peak Of Impact This Week; Production Cuts Have Occurred
- Argentina Will Receive Some Needed Rain In The Coming Week To Ease Dryness
- Brazil's Northeast Has Become Much Too Wet Raising Worry Over Early Season Summer Crop Conditions
- Center West and Center South Brazil Crop Weather Is Very Good
- East Australia Has Finally Received Some Needed Rain, But More Is Needed
- India Remains Much Too Dry For The Start Of Reproduction; Rain Possible Next Week
- U.S. Southern Plains May Get Some Rain Next Week

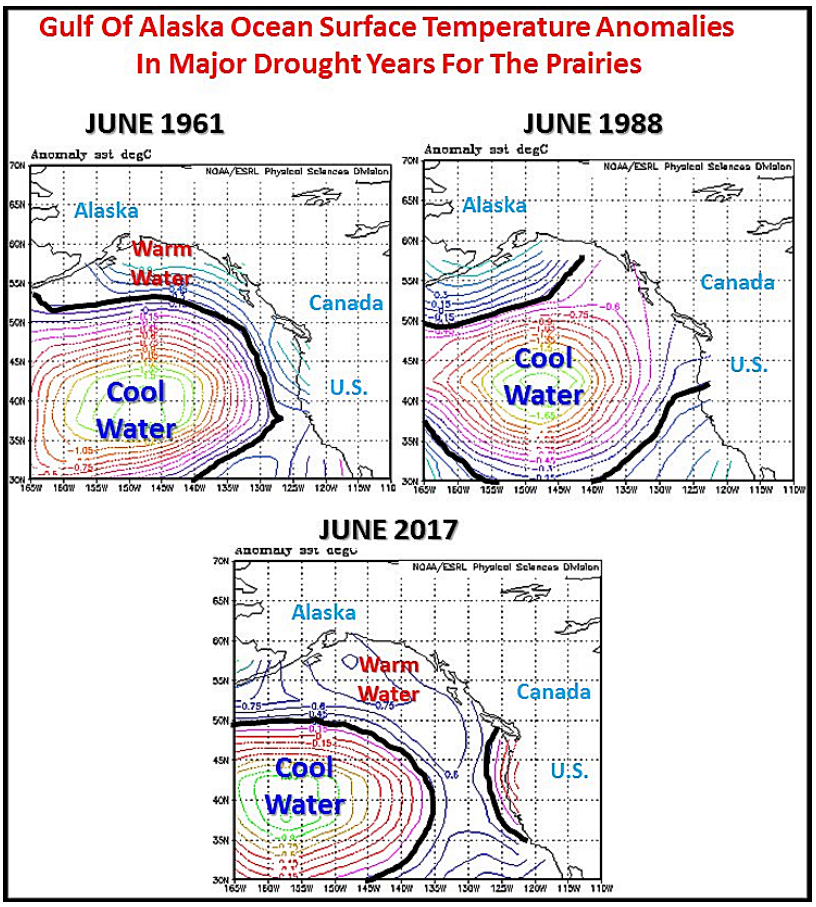
Cold Water In Gulf of Alaska Worrisome

Summer 2017 was a tough growing season for many areas across the Prairies. Drought settled in to the heart of the Prairies from southern Alberta through central and southern Saskatchewan to portions of southern Manitoba. The dryness was quite persistent and had it not been for a significant amount of subsoil moisture at the start of the growing season drought would have ruined the crop in most of the Prairies. Instead crops yielded better than expected in the driest areas.

The same pattern in 2017 also promoted frequent rain in northern crop areas of Alberta and east into a few of the northernmost portions of Saskatchewan.

Much of the anomalous weather of 2017 is being blamed on a large pool of colder than usual ocean water that was present in the Gulf of Alaska. The cold water restricted water vapor rising into the atmosphere from the ocean and also helped to produce a ridge of high pressure over the Gulf of Alaska. The high pressure ridge induced a northwesterly flow of air aloft across western Canada, including the Prairies. The persistence of this flow pattern restricted storm systems from coming into the Prairies and the cool water reduced the amount of moisture that each storm system brought into the region.

The pattern shown below has not completely dissipated and some of the recent ocean temperature change data has suggested that some of the colder biased conditions have been intensifying in recent weeks. If the trend continues the Prairies could be faced with another year of restricted precipitation. If



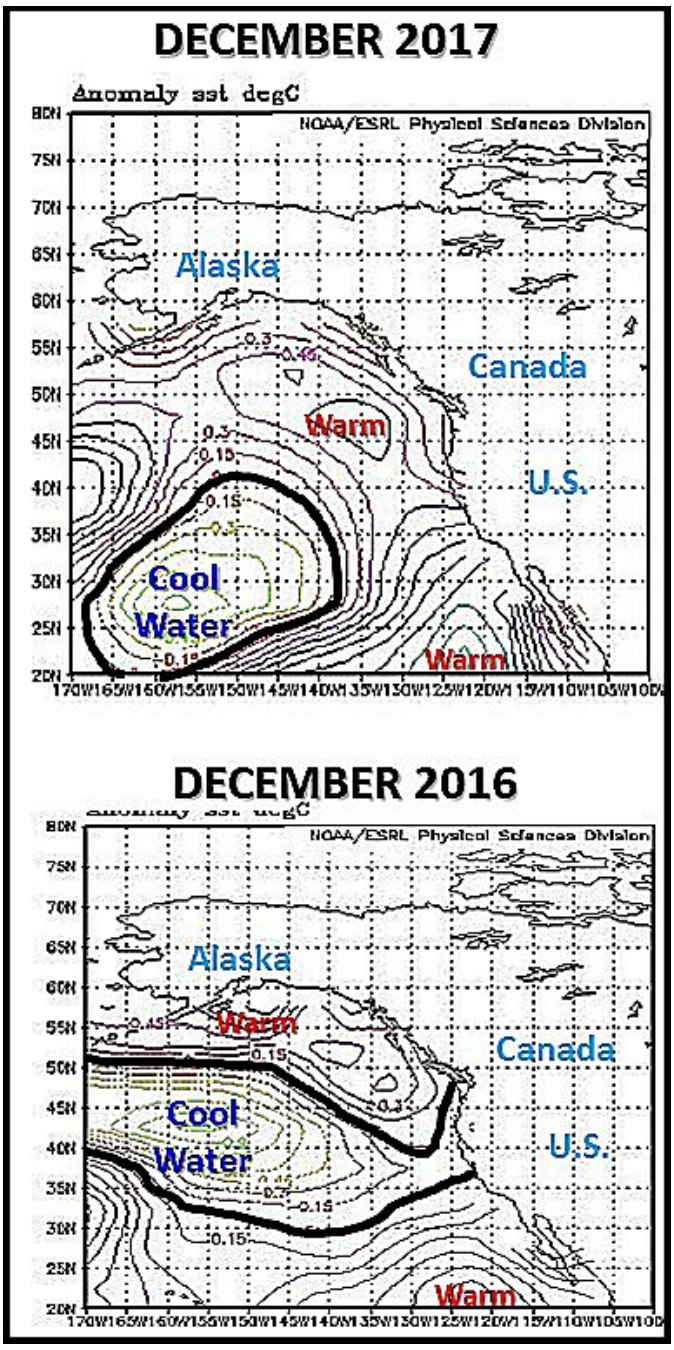
Argentina Dryness Still Threatens Production

that occurs for a second year in a row the impact on crop production could be devastating because much of the southern Prairies have no subsoil moisture. There is also concern over limited snow cover in parts of the drought stricken region. Limited spring snow melt, poor subsoil moisture and a returning pattern of limited rainfall could have a very serious impact on the Prairies.

The cool water was not expected to return for a second year, but the trend changes in recent weeks has begun raising some concern. At the same time the cool water is building in the Gulf of Alaska the 18-year cycle continues to promote a northwesterly flow across North America with deep surges of cold occurring at 45 day intervals.

The current bout of cold will begin abating this weekend and next week, but if our calculations are correct sometime around March 12 the temperatures will get quite cold once again. Readings will not be as far below zero as they have been this week, but they will still be well below average. The northwesterly flow pattern occurring this winter is not as much a factor of cold Gulf of Alaska water as much as it is a factor of La Nina and the 18-year cycle and the two are expected to play off each other for another few weeks.

The end result will be a continuation of restricted precipitation in the heart of the Prairies while frequent precipitation prevails along the front range of southwestern Alberta. The pattern is typical of weak La Nina events except the snow is occurring farther south into the United States



than usual because of the depth of cold in northern parts of North America.

Another concerning factor to weather in the coming growing season is the solar cycle. We are approaching a solar minimum and the year prior to the solar minimum, which should be in 2019, is often impacted by some cooler biased conditions in eastern North America. The only way that cool weather will prevail in the eastern parts of the continent is with a northwesterly flow pattern and or a ridge of high pressure over the western Prairies.

Each of these weather phenomena; the Gulf of Alaska cold water anomalies, the 18-year cycle, the solar cycle and the 45 day LRC cycle could reinforce one another and unless some changes occur this spring their may be another surprisingly difficult production year lying ahead.

One last factor for the growing season ahead is La Nina. La Nina events, when significant enough, can induce some drier and warmer biased conditions in the heart of the U.S. Plains and western Corn Belt during the spring. Such an area of anomalous weather might further impact the upper air flow pattern in Canada reinforcing some of the drier tendencies early this spring and then helping to induce some greater rainfall in the heart of the Prairies this summer. In this case winter and early spring La Nina will not help eliminate dryness in the Prairies, but late spring summer La Nina could help—at least a part of the region get greater rainfall, especially if La Nina is weak.

The forecast this spring is actually encouraging for change that will help many crop areas with improving moisture as time moves along. However, the Gulf of Alaska will be a key factor in determining weather this summer. Recent temperatures changes in the Gulf have been trending colder and that is not a good sign, although there is plenty of time for change.

Spring, Summer First Look Offers Slow Improvement

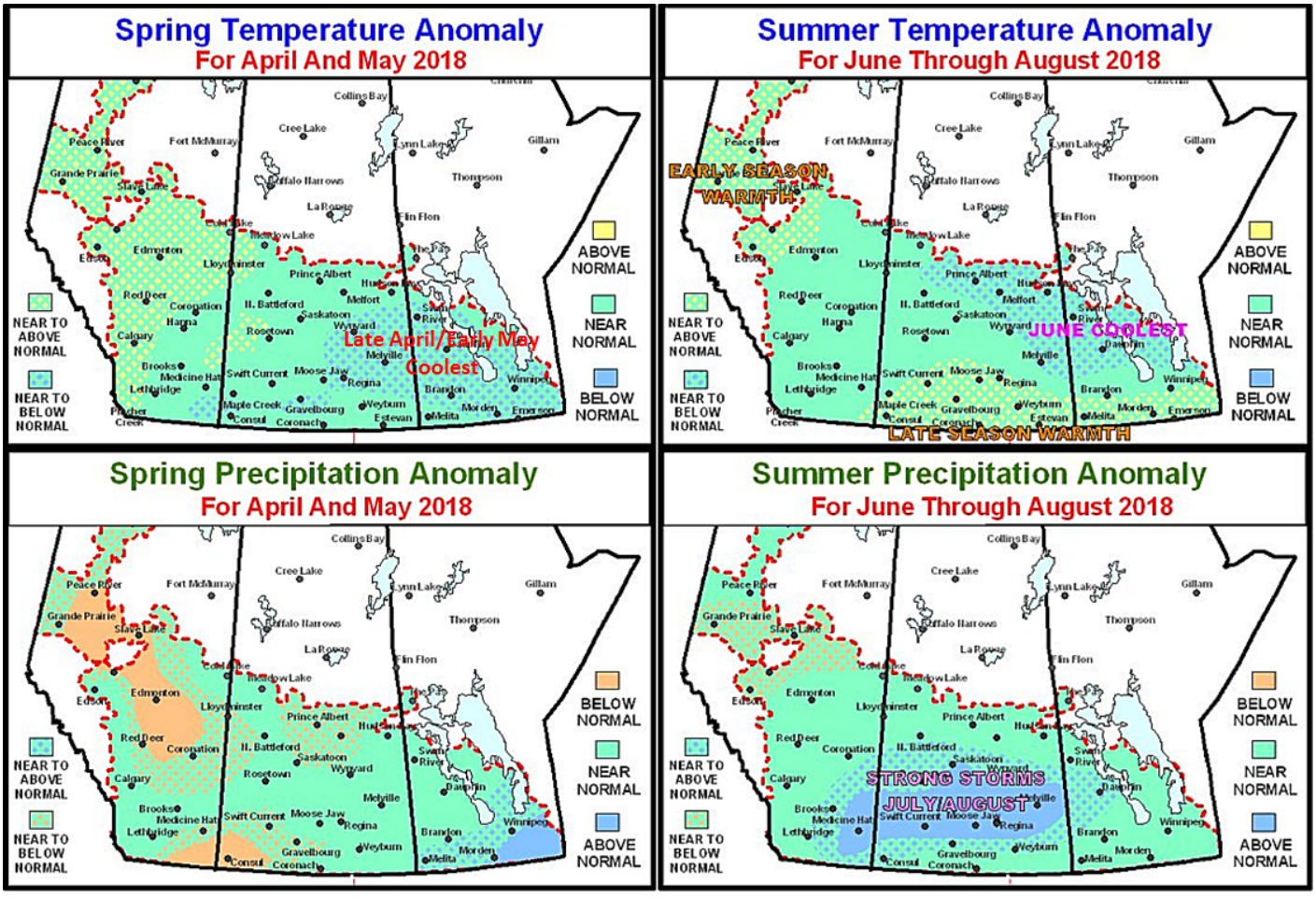
February and March weather may perpetuate the trends of this past winter with above average precipitation occurring mostly along the front range of the Rocky Mountains in Alberta. The region will come into spring with an abundance of snow on the ground, but many other areas in the Prairies will come to the growing season with a general lack of subsoil moisture and some worry over planting moisture in the driest areas.

April and May will bring opportunity for change in the Prairies with less precipitation and warmer weather occurring for a little while in western portions of the Prairies and in particular Alberta and a few western and northern portions of Saskatchewan. Precipitation is expected during the spring, but a northwesterly flow pattern will continue to dominate the region during the first half of spring limiting precipitation to a mostly near to below average range. Such conditions may provide some surface moisture for spring planting, but the trend will not provide much improvement in subsoil moisture which is expected to remain well below average in some areas from east-central and southeastern Alberta through central and southern crop areas of Saskatchewan to southern Manitoba.

Crop areas farther east in the Prairies will receive a little more moisture, although late spring will be wetter than early spring. There is some potential for wetter biased conditions to evolve in southern Manitoba and extreme southeastern Saskatchewan. The bias for greater precipitation in the southeastern Prairies may be greatest in late April and May than in March or early April.

Temperatures across the Prairies during the spring will be a little cooler than usual with mid– to late March and late April into early May coolest relative to normal. This will be a part of the 45-day LRC cycle and will likely influence the eastern Prairies far more than the west during the spring. Western parts of the Prairies will likely experience some warmer than usual tendencies at times and that coupled with the lighter precipitation bias may help some areas in the west to firm up over time.

Summer weather is expected to change a little more significantly, but the changes advertised are dependent upon a breakdown in the cool water in the Gulf of Alaska and the demise of La Nina conditions. If these two changes do not occur there will be some significant changes to the outlook and World Weather, Inc. will not be able to apply the changes until late March or early April at the



Spring, Summer Outlook First Look (continued from Page 3)

earliest. Concern over the cold ocean temperature anomaly in the Gulf of Alaska is the number one potential influence on Prairie weather this spring and summer. The cold water was expected to go away this year, but its persistence in December and recent trend for expansion and deepening anomalies raises a caution flag for the growing season ahead. If the ocean becomes as significantly colder biased as last year then change in the Prairies will not occur very quickly and a northwesterly flow pattern will prevail deeply into the spring and early summer restricting rainfall and keeping the western Prairies warm and the eastern Prairies cool.

Of course if the cold ocean water is still present through the summer getting significant relief from drought will be extremely difficult and crops will be thrown into a seriously stressful environment relatively quickly in the warm season because of little or no subsoil moisture.

Even though ocean temperatures is the concern the forecast was built with the assumption that the cold water would dissipate this year. Under that assumption summer will progressively trend wetter. June would likely have some increasing rainfall across the Prairies, especially in Saskatchewan while timely rain continues in a part of Manitoba.

July and August weather would then be enhanced as the U.S. monsoon season evolves. Weak ridge building in the central United States will help push moisture into the southern Prairies from the U.S. Rocky Mountain region. The same ridge of high pressure would likely generate instability in the central parts of the Prairies and the combination of an unstable atmosphere with a low level moisture feed from the southwest should translate into scattered showers and thunderstorms occurring often. There would be potential for strong to severe thunderstorms in the heart of the Prairies, as well.

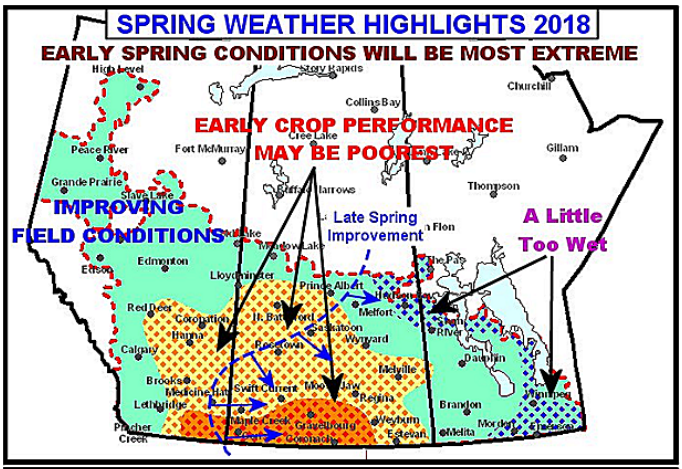
Temperatures in the heart of summer would likely be a little warmer biased in the southern Prairies and in particular southern Saskatchewan and southern Manitoba. A cooler than usual bias might linger in the northern Saskatchewan and northern and central Manitoba. The temperature contrast from north to south across the eastern and central Prairies will play into the moisture feed and instability creating the greater rainfall potential.

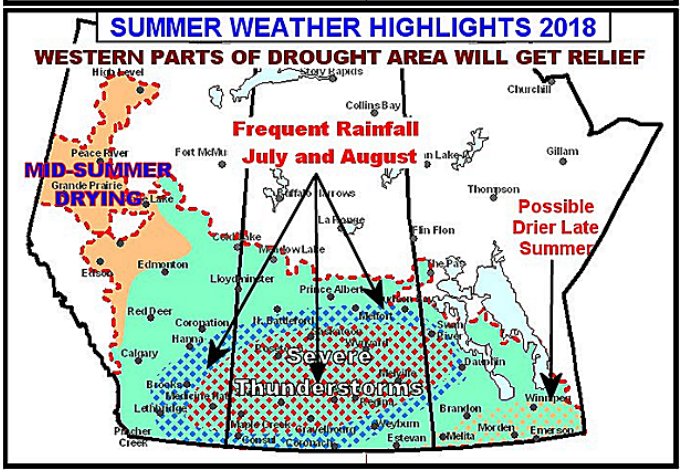
If the Gulf of Alaska stays cooler biased during the summer. The northwest flow would stymie the northward advance of U.S. monsoon moisture and it would act as a stabilizer to calm the atmosphere down and limit rainfall for a second summer in a row.

In this case, a return of more significant La Nina conditions would help the Prairies drought break down because it would help to change the upper air wind flow and provide a stronger influx of moisture into the Prairies. However, most of the computer forecast models are suggesting La Nina will become more insignificant over time and that reduces it as a potential source for counteracting the influence of a northwesterly flow pattern aloft if the Gulf of Alaska stays colder than usual.

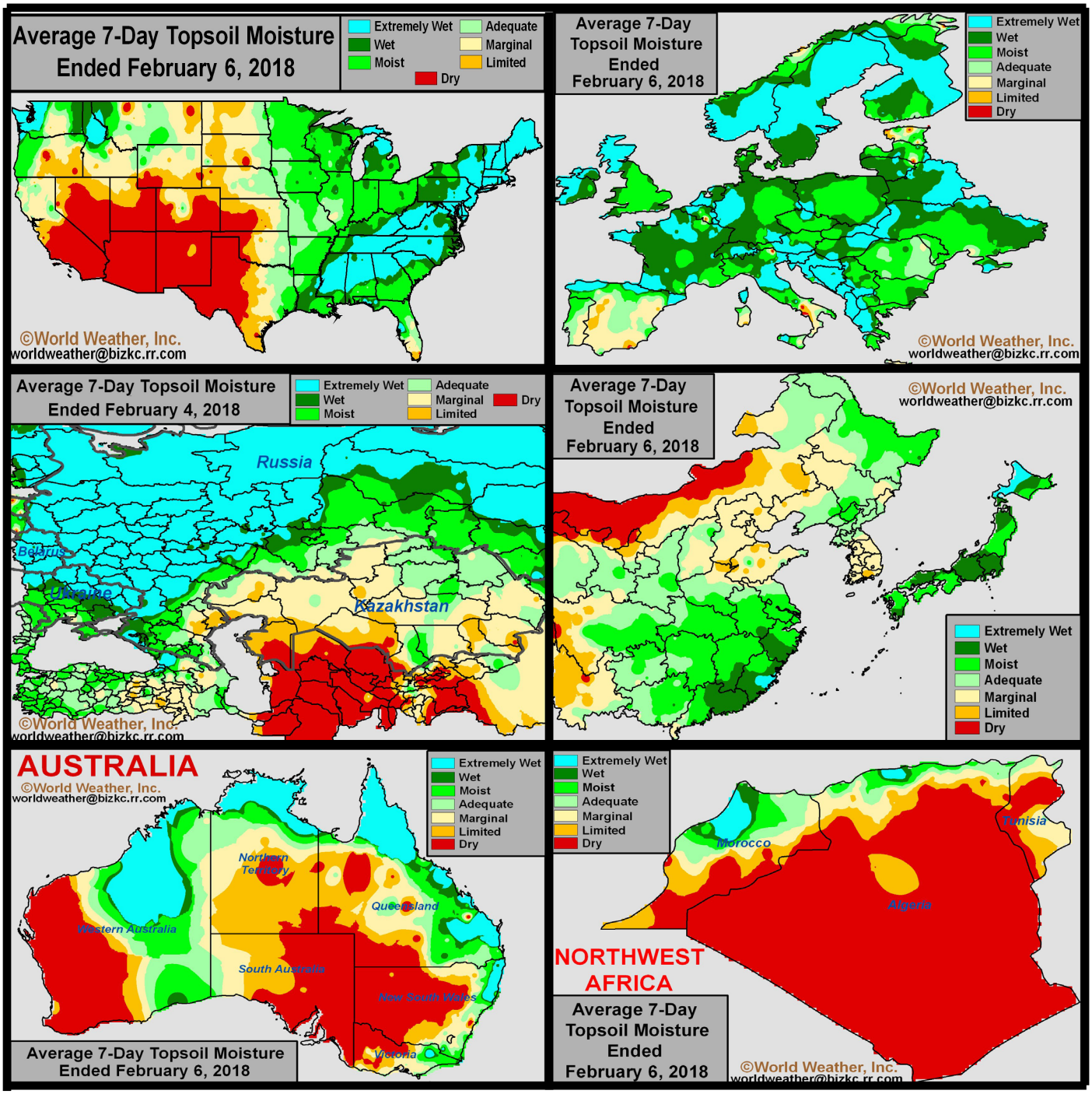
For now, the forecast will remain as described and illustrated on page 3, but similar to last year, the next few weeks will be critical in determining the late spring and summer weather.

The bottom line this spring will remain one of concern for the heart of the Prairies where moisture deficits are still substantial. Areas in the southeastern two-thirds of Saskatchewan will likely see improving precipitation and soil moisture as spring moves along, but the areas west of the blue dashed line on the spring forecast chart may experience the poorest precipitation pattern for restoring favorable soil moisture. Timely rain will occur, but not in the quantity needed to fix low subsoil moisture. Increasing summer rain intensity and frequency is then expected with the greatest precipitation in July and August at which time conditions will trend wetter.





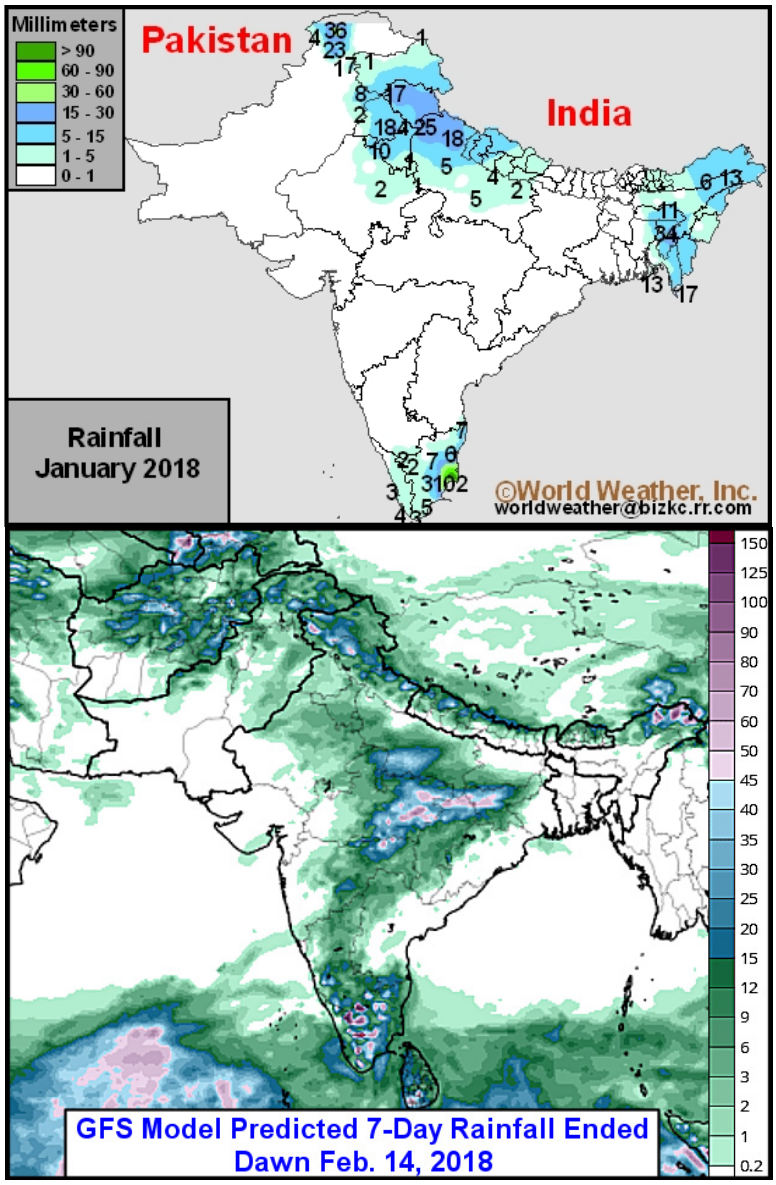
Selected Weather Images From Around The World



Europe and the western Commonwealth of Independent States, including western Russia and Ukraine, are abundantly to excessively moist. Some drying may be required prior to the start of spring crop development and fieldwork, but there is still plenty of time for conditions to improve. There is still some need for moisture in parts of Spain. Farther south in North Africa recent rain has helped to improve soil moisture in northern Morocco and parts of northern Algeria. However, Tunisia and southwestern Morocco still have some significant dryness to deal with. Weather in the next two weeks may improve Morocco's dryness, but Tunisia will likely stay dry. Turkey is another area that needs significant moisture. There has only been one significant precipitation event in Turkey during the past couple of months and soil moisture is still low. China weather has been and will continue very good with favorable soil moisture present until spring. Rain and snow will be needed in the northeast by late March. U.S. soil conditions are quite wet in the southeastern states and dry from the southwestern states through the Plains and not much relief is expected.

India Rainfall Possible This Weekend, Next Week

Dryland winter crops in India are struggling due to an extended period of dry weather and seasonable temperatures. Much of western-central and northern India reported little of rain of significance in January and was generally drier biased in December. Significant rain is always hard to come by during the winter season, but the best yielding crops nearly always come in years when timely rainfall occurs during the late December through February period. So far, there has only been one rain event in northern India and that was two weeks ago. Crop moisture stress has been evolving since then while crops move toward and into the reproductive process. That makes the next few weeks critically important for timely rainfall to support the best yields. A few showers will evolve later this week, but meaningful rain is not very likely. There is some potential for greater rain in some areas late this weekend and early next week.



Several areas from Punjab and Haryana into Himachal Pradesh and northern Uttar Pradesh reported a trace to 0.79 inch of rain with a local total in Uttar Pradesh of 1.00 inch for the month of January. Almost all of that occurred over a two-day period ending January 24. Pockets in eastern Rajasthan into central and southern Uttar Pradesh also reported upwards of 0.20 inch of moisture. Other production areas in central and western India were dry the entire month. Most of the rain that did fall was lost to evaporation relatively soon after it fell resulting in a limited amount of time for improved topsoil moisture.

Soil moisture is critically short in the main winter crop production areas of western, central, and northern India. Wheat, rapeseed, and pulse crops are produced in these areas at this time of year. Much of the dryland crop has been stressed in the absence of significant soil moisture and precipitation. Timely rain will be needed in the next few weeks to supplement irrigation and promote a better environment for the dryland crops. Continued dryness will further reduce production potentials, especially for the dryland crops.

A few showers will evolve later this week. The precipitation is expected to be erratic and mostly too light to counter evaporation. No serious change in soil or crop conditions is likely. The precipitation will be more of a tease to farmers and crops than anything else.

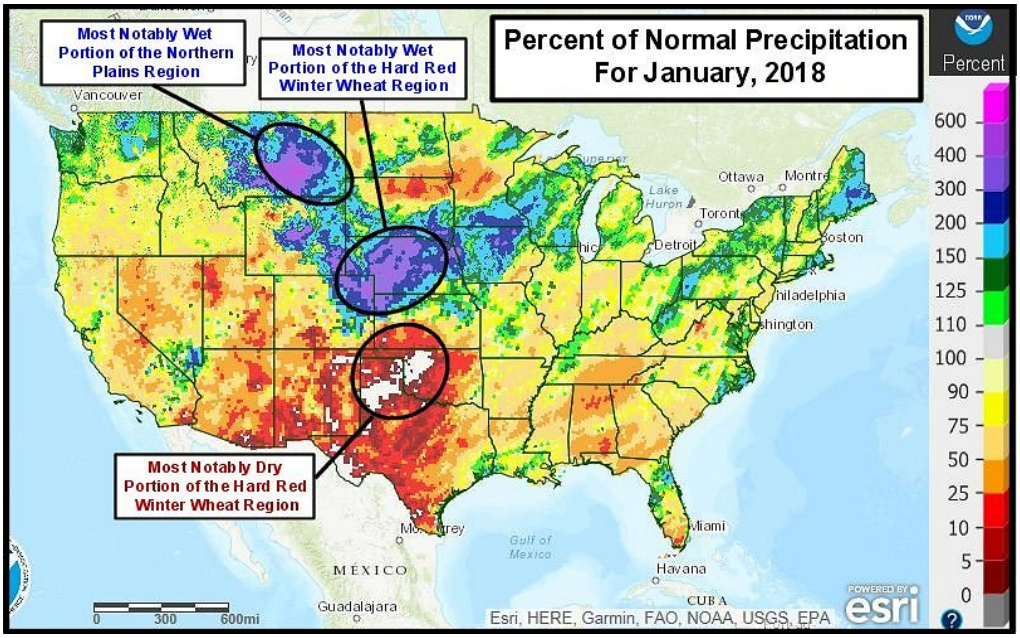
There is potential for greater rainfall beginning Feb. 11 and continuing periodically into Feb. 15. Confidence is not very high because of the precipitation being several days away leaving plenty of time for the forecast to change. However, if the rain evolves Sunday as advertised there would be potential for some benefit to crops in Madhya Pradesh, Uttar Pradesh and some surrounding areas. ***It is too soon to get specific about rain amounts, but early indications suggest 0.20 to 0.75 inch with a few locally greater totals possibly surpassing 1.25 inches in the pulse rich production region of Madhya Pradesh.*** Some of the computer forecast models have suggested greater amounts, but World Weather, Inc. believes the outlook is a little too wet and future forecast model runs are likely to reduce the event.

The environment will remain stressful for much of western, central, and northern India during the coming week, despite a few isolated showers. Worry over wheat, rapeseed, millet, sorghum, groundnuts and rice will continue until significant rain falls.

SW U.S. Drought Unlikely To Break

Drought in the southwestern U.S. has prevailed through much of this winter season and despite some potential for rain near mid-month, the odds disfavor a soaking for the region. Drought will likely prevail into March. In the meantime, some beneficial boosting of precipitation has occurred recently in Montana, Nebraska, northeastern Colorado and in a small part of both northwestern Kansas and from Iowa and southern Minnesota to Wisconsin.

January weather was driest in the southern Plains and in a part of the southwestern United States. A small region in northern South Dakota to west-central Minnesota and another in the interior southeastern states were also drier biased. However, numerous areas from New Mexico and West Texas to western Oklahoma were left completely dry during the month with some areas reporting no rain for more than 114 days. Surrounding the precipitation-free area was a region reporting less than 25% of normal precipitation. That left most of the region from southern Kansas through much of Texas and west into the southwestern desert region and southern Rocky Mountain region with extremely poor soil moisture. The environment has threatened winter wheat development and forced some serious decisions for livestock owners over whether to sell their herds or endure a boost in expenses by placing their herds on supplemental feed. Some of the dryness has forced cattle off of winter wheat fields and some of the wheat itself has possibly withered and died because of either dryness or recent bitter cold.



Below average precipitation in the interior southeastern United States is of interest, but it has not led to many problems due to at least some rain and snow falling periodically in recent weeks. The region does need additional precipitation, but the drier bias is not a critical situation for now.

Dryness from South Dakota to west-central Minnesota is of greater interest, but it, too, is not a crisis. The lack of snow cover in parts of South Dakota earlier this winter, however, likely led to some winterkill when extreme cold impacted the region while snow cover was minimal.

In contrast to the below average precipitation areas noted above during January, precipitation was greater than usual from Montana to Nebraska, northeastern Colorado and extreme northwestern Kansas. A wetter than usual bias also occurred from Iowa and far southern Minnesota to parts of Wisconsin.

The wetter bias is reflected in some significant snowfall recently. Depths of snow are greater than usual and when it melts there will be some significant runoff into several rivers and streams to help water supply for the spring and summer. Drought in Montana has been eased, although not eliminated. The same is true for the western Dakotas and all three of these areas suffered from a significant drought during the summer of 2017 that impacted production. That northern Plains drought extends northward into Canada's Prairies and that region, too, has not seen much relief except in southern Alberta where there is significant snow on the ground.

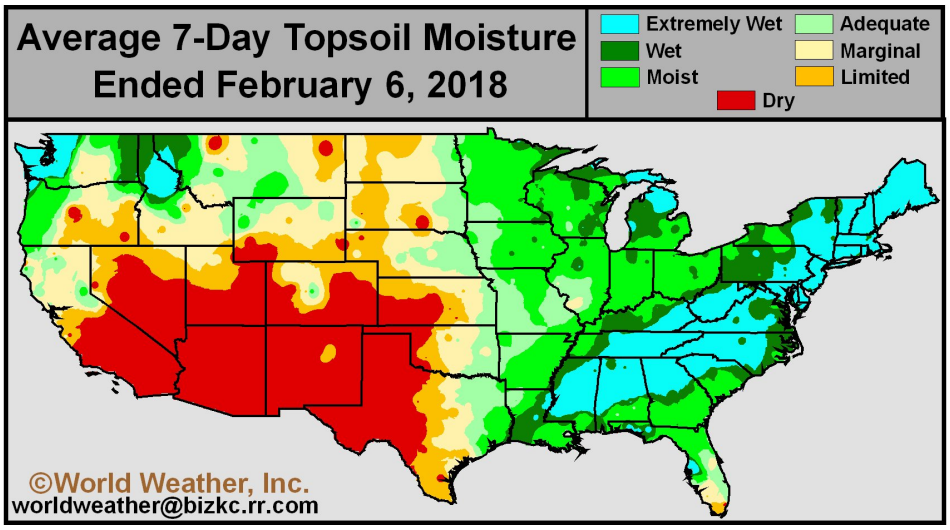
Drought is most serious in southern portions of hard red winter wheat country and it extends to the east into southern Missouri and to the west into southern California and the southern Rocky Mountain region. Drought in the interior southeastern states is also prevailing, although of less interest right now because soil moisture is still rated favorably while many of the other drier biased areas have poor soil moisture.

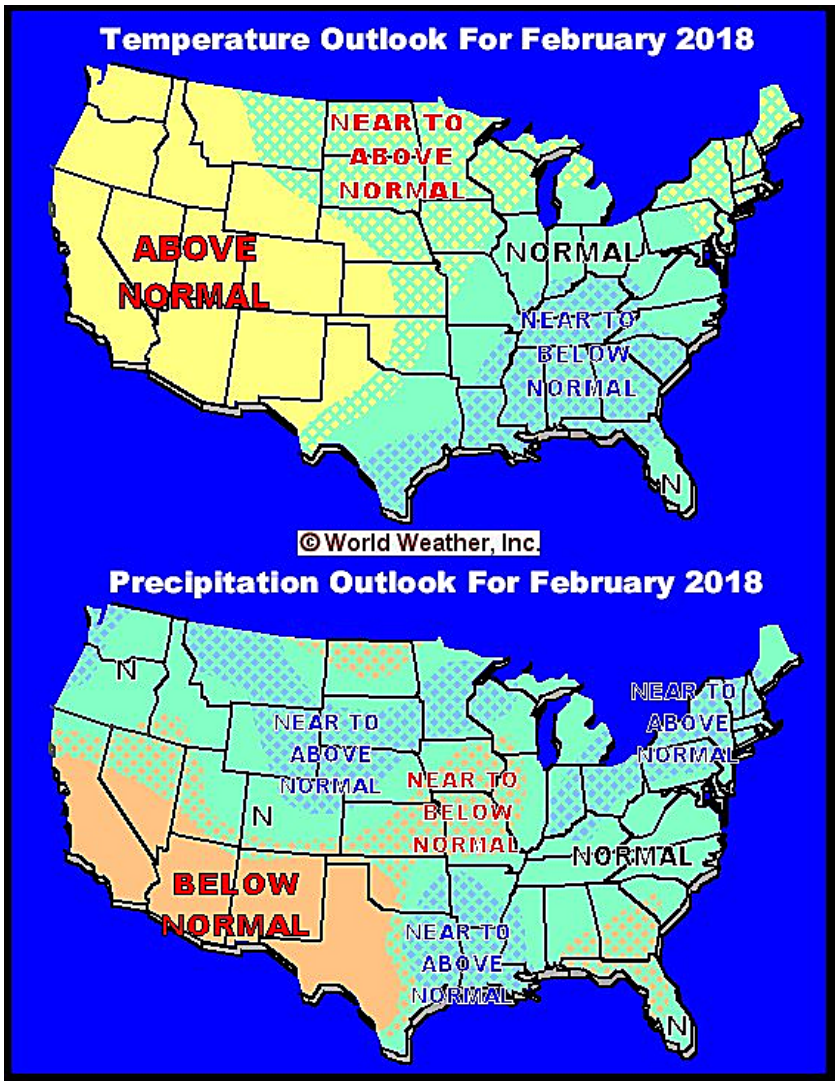
The month of February is expected to remain drier than usual in the southwestern United States. Most areas from central and southern California through the central and southern Great Basin into the southern Plains will remain drier than usual. Precipitation may occur, but it will be well below average for at least one more month. The situation will not likely cause any new problems for livestock or winter wheat, but it will perpetuate the problems already pre-

SW U.S. Drought Unlikely To Break (continued from Page 7)

sent.

The lack of moisture puts much pressure on spring weather in the southwestern United States. Dryness must be relieved and since March is quite often the first month of spring warming some crops and grasses usually begin development during the month. The need for moisture in southwestern portions of the Plains will skyrocket for both wheat and livestock grazing purposes. A continuation of dryness would threaten production cuts and World Weather, Inc. already believes wheat production has been cut by winterkill and drought.





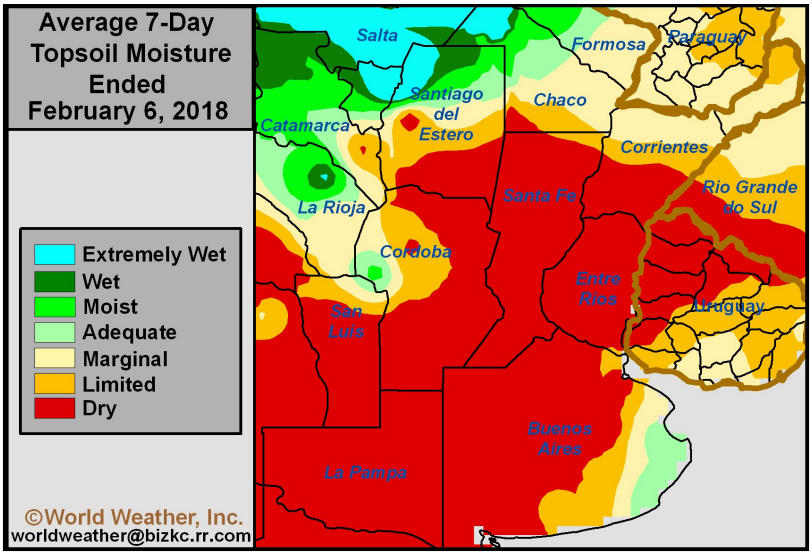
March and April should bring better rainfall to the region from the central U.S. Plains to the western Great Lakes region and upper Midwest. However, the northwestern Plains and far southwestern Plains will not likely see as much rain as they need to break drought conditions and that will likely raise some serious concern for planting and general agriculture in both areas. Lingering La Nina conditions will offer no serious relief to the situation with it likely reinforcing a drier-biased environment for winter crops.

There is a relatively good chance that the southwestern Plains will receive some light rain briefly during mid-February. The precipitation is not likely to be a general soaking, but it will end the prolonged period of rain-free conditions that has occurred in recent months. The moisture will excite many farmers and ranchers into believing the end of the drought has begun, but by late February and early March the rain potentials that occur for a brief period of about ten days beginning Feb. 14 will come to an end and the region will have to wait a while longer before the next opportunity for rain returns.

In the meantime, favorable moisture in the Midwest will prevail during February, but most significantly in the eastern parts of the region. Western Corn Belt areas will get some periodic precipitation and because of the cool temperatures much of it will help to maintain marginally adequate soil moisture in some areas. However, greater rain that is advertised in March will be of great interest for Missouri, parts of Illinois and parts of Iowa that are still a little drier biased after last summer's poor rainfall distribution.

Argentina To Get Some Drought Relief Thursday-Sunday

Very little rain has fallen in Argentina recently and temperatures were warm, but not excessively hot during the past week. Highs warmed to the 30s Celsius late last week into the early part of this week. Daily evaporation was significant and led to the depletion of topsoil moisture in much of the nation. Crop development in key corn, soybean, sunseed and peanut producing areas was totally dependent upon subsoil moisture during the past several days. The most serious has been in several areas from La Pampa into western and some central Buenos Aires locations and across Santa Fe, northern Entre Rios, southeastern Santiago del Estero and parts of northeastern Cordoba. Crop stress that was once confined to 25% of the nation's grain and oilseed areas has expanded to impact nearly 60% of crop production region and some further expansion is possible over the next three days.



Some relief to dryness is forthcoming, but it will be a slow process and the longer it takes to bring in significant rainfall the higher the potential that future model runs will reduce some of the expected rain. The upper air wind flow will become most favored for rainfall Thursday through the weekend. Thursday and Friday rainfall will become most concentrated on areas from San Luis and Cordoba to Entre Rios and a few northern Buenos Aires locations where two day rain totals will be 0.20 to 0.70 inch and a few 1.00 to 2.00-inch totals in San Luis and Cordoba.

San Luis and Cordoba have not suffered from dryness like other areas in Argentina. The rain returning to those areas first suggests crop conditions in those areas will stay best and the outlook highest. The lack of moisture elsewhere suggests worsening crop stress. Partial relief from dryness is likely in Santa Fe, northern Buenos Aries and Entre Rios Thursday and Friday. No general soaking of rain will occur in areas east of Cordoba and most of the rain that falls may just briefly moisten the topsoil. Without follow up rainfall it will just be a day or two later and the ground will be just as hard and unforgiving for crops as it was earlier in the week prior to the rainfall, although temperatures will be cooler.

The greatest chance for improvement for crops in Santiago del Estero, northern Cordoba and across portions of both Santa Fe and Entre Rios will occur late Friday into Sunday when rainfall of 0.30 to 0.80 inch and local totals over 1.00 inch will result. That sounds like better rainfall, but a more general soaking must occur to fix topsoil moisture enough to carry crops more than a few days without more moisture falling. There is potential for greater rain, but confidence is low.

Temperatures will trend cooler later this week, but readings early in the week will be in the 30s to 41 degrees Celsius with a few hotter readings just before the cooler air and thunderstorms arrive late this week. The cooler air will drop temperatures to the 20s to around 31 in far southern Argentina at the end of this week while readings in the north continue in the 30s. Eventually, the cooler air will reach northern portions of the nation, but probably not before the end of the weekend.

Several more days of drying will occur next week before rain develops after Feb 16. That suggests Buenos Aires and La Pampa will only receive a restricted amount of rain for up to ten days putting them in the highest risk potential for additional falling production, despite cooler temperatures.

Buenos Aires is a very important grain and oilseed producing province and it does carry a fair amount of the late season crops. Dryness that extends into mid- February may not bode well for production. Losses in Buenos Aires on top of those occurring in other areas of the nation earlier this season will further shrink Argentina's production. However, good production from Cordoba and immediate neighboring areas will help to minimize some of the production cut.