National Seasonal Assessment Workshop

Eastern & Southern States

Final Report

January 19–21, 2005
Shepherdstown, WV

**Melanie Lenart,
Tim Brown,
Heath Hockenberry,
and Gregg Garfin**

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- Tim Brown, Program for Climate, Ecosystem, and Fire Applications, Desert Research Institute
- Gregg Garfin, Climate Assessment for the Southwest, University of Arizona
- Heath Hockenberry, National Predictive Services Group
- Rick Ochoa, National Predictive Services Group
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Foreword

The 2005 National Seasonal Assessment Workshop Eastern and Southern States was, for many of the participants, the second iteration of a process to improve fire management decision making through preseason fire-climate assessment. As hoped for, the 2005 workshop ran more smoothly than the 2004 workshop. Participants were better prepared for the 2005 workshop; in fact, some new climate and fire analysis products, designed specifically for this workshop, were unveiled. Communication between participants, as well as between participants and organizers was excellent. Though it is hard to quantify a characteristic such as enthusiasm, I can confidently say that this year's workshop was all about enthusiasm—for the process, for the information shared, for the geographic area discussions, for the frank and open manner in which the strengths and weaknesses of the climate forecasts were presented, and for the reports produced.

An outstanding achievement of this year's workshop was the identification of achievable recommendations to improve this process in future years. National Oceanic and Atmospheric Administration Climate Prediction Center climate forecaster Ed O'Lenic was open to participant requests to create experimental climate prediction products that have the potential to improve fire management decision making. Participants identified ways to improve the distribution of workshop products to key fire managers, and ways to increase participation, in future workshops, by fire managers and fuels specialists in the 33 states in the Eastern and Southern geographic areas. Participants also recommended the participation of colleagues from Canada in future workshops. If provided with the funding and communication necessary to implement this suggestion, workshop organizers believe that international participation could lead to a quantum leap in science-based fire management decision making and international cooperation.

I would like to extend my sincere thanks to workshop co-organizers, Tim Brown, Heath Hockenberry, Melanie Lenart, and Rick Ochoa, and to all of the participants in the 2005 NSAW Eastern and Southern States.

Gregg Garfin
February 14, 2005

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The 2005 National Seasonal Assessment Workshop Eastern and Southern States would not have been possible without the cooperation and hard work of many people and the commitment of several agencies and institutions. Special thanks go to the following individuals for providing valuable input and assistance. We apologize if we have left anyone's name off the list.

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We extend our sincere thanks to Ed O'Lenic for taking time from his busy schedule to attend the 2005 workshop. Ed's engagement with other participants and his serious concern for enhancing the ability of climatology to improve decision making gave a big boost to this year's meeting.

This year's workshop summary and proceedings would not be possible without the enthusiastic participation, dedication, and talent of lead author Melanie Lenart, who worked tirelessly to get this volume out in a timely fashion.

As always, we are grateful to Shoshana Mayden and Kristen Nelson, whose editing and graphic skills are abundantly evident in the workshop summary and proceedings.

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Executive Summary

Eastern and Southern Fire Season 2005

Peninsular Florida was deemed susceptible to significant fire potential this spring (Figure 1, page 21) during a January 19–21 workshop involving 21 fire managers, wildland fire analysts, climatologists, and predictive service meteorologists from federal and state agencies. Fuel buildup from four hurricanes in 2004 could make forests volatile if coupled with the drier-than-average conditions predicted for late winter through late spring.

Fire potential is expected to be below normal to normal in the four compacts (delineated in Figure 2, page 21) of the Eastern area and in the remainder of the Southern area. In the Eastern area, the potential for drier-than-average conditions (Figure 3, page 22) is expected to be outweighed by current conditions that are wetter than average (Figures 4 and 5, page 23). However, the fire season could start earlier than usual in parts of the region lacking snow cover.

Fuels specialists cautioned that dry spells of between 7 and 30 days could greatly increase the likelihood of local fires starting even in areas considered to have below-normal fire potential. Updated assessments will be issued throughout the fire season.

Climate Assessment and Forecast

Although tropical Pacific sea surface temperatures indicate a weak El Niño in progress, which usually brings above-average precipitation to Florida, the atmosphere has not responded in a typical way to the ocean patterns. Total precipitation across the peninsula was well below average during the last quarter of 2004 (Figure 4d).

Two-category consensus climate forecasts project a mixed bag of temperature and precipitation effects east of the Rockies, the most important of which are increased chances of above-average spring temperatures along the Southeast coast (Figure 3a–d) and below-average precipitation for peninsular Florida (Figure 3e–h). Ancillary information suggests the hurricane season in the late summer and fall of 2005 could be less intense than the 2004 season.

Fuels Assessment

Hurricane blowdown in Florida and Alabama is a major source of concern for the Southern area, because these fuels could intensify fires. Southern Florida and parts of the Carolinas are already registering higher than average values of Keetch-Byram Drought Index, an index that considers the potential effect of recent temperature, precipitation, and relative humidity values on heavy fuels such as logs. Given initial values, the index is expected to reach levels of concern by April or May.

The unusually high fuel loads in Florida increase the chances of igniting ground fires in peat or other highly organic soils if extended drying occurs. Also, wildfires and prescribed burns in these areas will be more likely to shoot sparks to start spot fires outside the fire perimeter, especially as humidity drops below 35 percent.

Tree mortality from insects in other regions similarly increases heavy fuel loads. Jack pine budworm infested more than 43,000 acres in the Bemidji/Park Rapids area of Minnesota, and southern pine beetle has affected more than 10,000 acres of mountain forest from North Carolina through Virginia. Also, trees killed by previous hurricanes in North Carolina in 2003 and 1998 increase the fuel load in some parts of the state.

Resource Summary

Management implications for the eastern half of the United States are anticipated to be routine, with the exception of those areas of heavier fuel loads in Florida, parts of Alabama, the Appalachian Mountains, and Minnesota. Workshop participants exchanged information about the potential for sharing heavy equipment with Florida given the expressed difficulty posed in getting to fires blocked by jackknifed piles of downed trees.

Human activities cause most fires in the eastern United States, and debris burning is a major contributor to fire ignitions. Although firefighters typically manage to suppress fires quickly, resources can be strained by a large number of nearly simultaneous starts.

During the winter/spring period preceding the green-up of vegetation, regions with far below-normal snow cover may require above-average firefighting resources if fine fuels remain uncompacted. However, the fall 2005 season may require fewer resources for hurricane response (a job that falls to firefighters) compared to 2004.

Workshop Summary

These annual assessments are designed to allow decision makers to proactively manage wildland fire, thus better protecting lives and property, reducing firefighting costs, and improving firefighting efficiency.

The 2005 workshop was part of the third national assessment organized by the Program for Climate, Ecosystem, and Fire Applications, the National Predictive Services Group (NPSG), and the University of Arizona's Climate Assessment for the Southwest (Garfin et al., 2003; 2004a; 2004b). All participating agencies are listed below.

This was the second workshop devoted specifically to the NPSG's Eastern and Southern areas (Garfin et al., 2004a). A western assessment will be held in late March 2005.

Participating Agencies

Allegheny National Forest
Bureau of Indian Affairs
Bureau of Land Management
CEFA/Desert Research Institute
CLIMAS/University of Arizona
COAPS/Florida State University
Department of Interior
Eastern Area Coordination Center
Florida Division of Forestry
Georgia Forestry Commission
Minnesota Department of Natural Resources
National Predictive Services Group
National Park Service
New Jersey Forest Fire Service
New York State Forest Rangers
NOAA Climate Prediction Center
NOAA Office of Global Programs
North Carolina Division of Forest Resources
Northeast Regional Climate Center/Cornell University
Southern Area Coordination Center
USDA-Forest Service
Washington and Jefferson National Forests

Introduction

Background and Goals

Firefighters have long used weather information along with indices of fuel moisture to help them assess the chances of fire danger throughout the season. Meteorological forecasts about likely weather patterns, however, extend only about two weeks at best. Climate forecasts, on the other hand, can be used to consider the likely climate patterns for the entire coming season, thereby giving forest managers a heads-up on what to expect in regard to potential resource demand as well as enlightening other management decisions, such as the prospects for fire use or prescribed fire in the coming season.

The main goal of the National Seasonal Assessment Workshop (NSAW) held January 19–21, 2005, was to create a regional assessment of the coming year's significant fire potential for the Eastern and Southern Geographic Area Coordination Centers (GACCs). Toward that end, the three groups organizing the workshop—the National Predictive Services Group, the Program for Climate, Ecosystem and Fire Applications (CEFA; a program of the Desert Research Institute), and the University of Arizona's Climate Assessment for the Southwest (CLIMAS; funded by the National Oceanic and Atmospheric Administration)—brought together 21 climatologists, meteorologists, and fuel specialists to prepare an assessment during the third annual workshop. The workshop was held at the U.S. Fish and Wildlife Service's National Conservation Training Center in Shepherdstown, West Virginia, where on-site meals and after-hours socializing further facilitated the exchange of ideas and firefighting experiences.

Large-scale western fires associated with continental-scale drought as well as long-term fuel buildup helped inspire the first NSAW (Garfin et al., 2003a), held in March 2003. The peak for western United States fire activity tends to move in a wave from the May–June high in the Southwest up to the typical August–September further north. However, forest managers in the eastern half of the United States are typically at the height of their spring fire season by the time the national workshop was held in late March.

To accommodate each region, separate workshops were scheduled starting in 2004, with the annual eastern workshops held in January, and annual western meetings held at the end of March. Both workshops are designed to assess significant fire potential for coming fire seasons at the regional scale of the GACCs.

Although the exact definition of "significant fire potential" remains to be refined by the National Wildfire Coordinating Group, the term is tentatively defined as:

> ...the chance of having fires of such size, complexity, or number that they will require resources beyond the area in which they originate. An above-normal potential indicates resource response will likely be needed from regional or national resource managers. The potential for a significant fire situation is a sum of factors that includes fuels, ignition triggers, potential weather and climate influences, and resources.

When assessing significant fire potential, resource managers and climate and weather specialists are encouraged to consider the number of fires as well as the burn area, because each identified fire typically requires resources for suppression. In the humid, highly populated eastern United States, the capacity for large-scale burns is much smaller than in the West, but resources can be strained by the sheer number of fires occurring simultaneously on the landscape. Human activities cause most fires in the eastern United States, and debris burning is a major contributor to fire ignitions. In fact, about 96 percent of the 2004 fires in the Southern area were started by humans, according to a wildland fire report by area intelligence officer Pete Masiel.

Workshop Process and Results

On the first day of workshop, climatologists and meteorologists gathered to prepare the consensus climate forecast (see section 2). State and regional level land managers and fuel specialists exchanged reports on conditions affecting fine fuels (grasses and leaf litter) and heavy fuels (fallen trees and decaying logs) and then learned the forecast projections. The group then divided by Southern and Eastern areas and worked together over the next day and a half to produce the outlooks that are included in sections 3 and 4. A full list of participants is included in Appendix C. Representatives from the Eastern and Southern areas then shared their findings with each other on the third day of the workshop, along with recommendations that could further improve the process next year.

After comparing state-level information on potential fuel sources with projections of how the regional climate might behave through March, the group concluded that the spring 2005 season was likely to be normal to below-normal for most of the region, with the likely exception of Florida.

Southern Area

In the Southern area, four hurricanes made landfall in Florida last year, and another one struck via Mobile Bay, Alabama. Fuel buildup from these hurricanes could make peninsular Florida forests particularly volatile, because drier-than-average conditions are predicted from late winter through late spring. About 20 million acres in Florida were considered affected by tree blowdown from the hurricanes, with more than 4 million of these "heavily affected." An increase in heavy fuels from beetle-killed trees was also cited as an issue of concern for between 10,000 and 20,000 acres of Appalachian mountain forest from North Carolina through Virginia. Also, trees killed in North Carolina from two 1998 hurricanes are now reaching the ground, going from vertical to horizontal fuel loads and increasing the potential for intense fires accordingly.

Eastern Area

Eastern area workshop participants concluded that the significantly wetter-than-average current conditions should outweigh climate forecasts for slightly increased chances of drier-than-average conditions in the Northeast during the spring. However, the fire season could start earlier than usual in parts of the region lacking snow cover. A major snowstorm that arrived on January 21, 2005 immediately after the workshop, may have alleviated some of the expressed concerns that low snow cover could create conditions for early-season fires because of the availability of uncompacted fine fuels in many areas, including Minnesota. However, full compaction will depend on the extent of snow cover, the weight of the snow, and its duration on the landscape. The availability of heavy fuels was a concern for about 15,000 acres in northwestern Pennsylvania, where felled trees from a July 2003 blowdown have cured.

Fuel specialists from both areas agreed that brief dry periods could be enough to ignite wildfires that could strain local resources over the short term, with periods of concern ranging from about one week in some eastern states to about three weeks in more humid states further south (Table 1). Many meteorological events, such as transient high pressure systems, fall outside of the realm of seasonal climate predictability. A presentation by NOAA-Climate Prediction Center forecaster Ed O'Lenic, on the values and limitations of seasonal climate predictions, helped participants understand the strengths and weaknesses of such forecasts.

Table 1. The length of transient dryspells that could shift heavy fuels into the danger zone for significant fire potential, based on the results of an informal workshop tally. Winds boost evaporation rates and spark fires.

State	Dry days that typically increase local significant fire potential
Florida	10–40, depending on season
Georgia	20 (three weeks)
Minnesota	20 (three weeks)
New Jersey	>10, if humidity <30% and dry winds
North Carolina	7–10, takes ½ inch rain to reduce risk
Pennsylvania	7–10, dry weather or high winds

Verification of 2004 forecast

The workshop process also included an opportunity to consider the success of last year's climate forecast and subsequent determination of significant fire potential in the coming year. During the 2005 workshop, participants confirmed that last year's assessment of a below-normal fire season largely held true. As of the end of November, about 12,000 fires had burned about 98,000 acres in the Eastern area covering 20 northeastern states, putting 2004 below the 10-year average on both counts, according to information provided by the Eastern Area Coordination Center's Karma Kanseah. The Southern area fire season was also below normal to normal, with a tally of about 449,000 acres burned in about 28,800 fires according to Peter Masiel. A busy March in the Southwest, sparked by dryness from a high pressure zone near Florida, was balanced by an abbreviated fall fire season quenched by hurricane rains. Although West Texas had been identified as having above-normal significant fire potential in 2004, that forecast did not materialize. Texas' good fortune was mainly due to a frontal system, which drenched much of the West in early April, with light rains for days on end.

Participants were enthusiastic about the opportunities offered during the workshop to exchange information, gain climate and fuel knowledge, and consider the potential for resource demand during the coming fire season.

2. Consensus Climate Forecasts

Seasonal forecasts of temperature and precipitation anomalies were produced for the eastern and southern United States as input into creating wildland fire seasonal outlooks for the two areas (Figure 3, page 22). The forecasts used a two-category probabilistic approach, which starts with the assumption that there would be a 50 percent chance of below-average conditions and a 50 percent chance of above-average conditions (temperature or precipitation) and then considers how oceanic and atmospheric conditions and trends might influence that probability. The resulting forecast does not attempt to predict the actual temperatures or amount of precipitation, just the likelihood that these values will be above or below average for the area in question.

The forecast was designed to meet workshop participant's needs to directly integrate climate forecast information into specific assessment decisions. The fundamental basis of each seasonal forecast was the official National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Center (CPC) long-lead outlooks issued in mid-January, but each forecast aimed to provide additional probabilistic information, if possible, for areas where individual CPC forecasts showed no confidence, or where new or updated information could be used and agreed upon to alter the official forecast.

Consensus Process

Forecast consensus was reached by reviewing and integrating information from several seasonal climate prediction tools (e.g., sea surface temperatures, numerical model predictions, trends). Model information was utilized from the CPC, NOAA-CIRES Climate Diagnostics Center (CDC), the Scripps Institution of Oceanography Experimental Climate Prediction Center (ECPC), and the International Research Institute for Climate Prediction (IRI), although the final consensus is not necessarily endorsed by each agency. Additional climate information of ocean and atmosphere elements for regions affected by the El Niño Southern Oscillation (ENSO) signal, along with land surface temperature and precipitation trends, were obtained from CPC and CDC. Forecaster judgment was included from CPC, USDA-Forest Service, Northeast Regional Climate Center, Florida Division of Forestry, Southern Area Coordination Center, Florida State University's Center for Ocean-Atmospheric Prediction Studies, and the Desert Research Institute Program for Climate, Ecosystem and Fire Applications.

Forecasts for four 3-month overlapping periods from February–April through May–July were produced for both temperature and precipitation via a round-table forum during the workshop (Figure 3). A new experimental process was used to achieve consensus. First, a "liberal" initial forecast was developed by CEFA. Then the forecast team was asked to justify why they would or would not agree with the initial forecast. Forecast discussion led to determining regions of warm/cool and dry/wet, and assigning a consensus probability.

Because the forecasts were comprised of only two categories, the probabilities simply represent the perceived chance of conditions being above or below average. For example, if the forecasters determined a 10 percent chance of the above-average category occurring, then the probability of the above-average category became 50 percent plus 10 percent, or 60 percent. Increasing percent values above 50 also indicates a relative increase in forecast confidence. Given the reliability of current climate forecasting technique, 55 percent would be considered low confidence and 70 percent high confidence. A forecast probability of 50 percent means no forecast confidence for either category.

Climate Forecasts

The 2005 Eastern and Southern area consensus temperature and precipitation for the periods February–April, March–May, April–June, and May–July are depicted in Figure 3. For the first two seasonal forecasts, below-average temperatures are depicted for much of the Eastern and Southern area (Figs 3a and b). In April–June, this pattern reverses for some of southeastern coastal states, but below average is shown for the region including Texas, Louisiana, Oklahoma, and Arkansas (Figure 3c). In May–July a large area of above-average temperature is predicted for Texas eastward all the way up into New England, while below-average temperatures are forecast for the upper-Midwest states (Figure 3d).

The February–April precipitation outlook shows above-average precipitation is expected for the Texas region northward to North Dakota, while below-average precipitation is expected for the Ohio Valley, Great Lakes, Mid-Atlantic, New England regions and Florida (Figure 3e). In the March–May season, below-average precipitation is expected for the Great Lakes and New England regions, and southern Florida (Figure 3f). In the April–June season, below-average precipitation is expected only for a portion of New England and southern Florida (Figure 3g). For the May–July season, no consensus precipitation forecast could be reached with confidence, so an "equal chance" of precipitation being above or below average (depicted as white area) applies everywhere (Figure 3h).

Except for February–April precipitation and May–July temperature, none of the forecast probabilities are particularly large. This reflects, in part, generally low confidence in the results of integrating dynamic models, and the lack of a strong ocean signal that would increase the probability of affecting some areas.

Current conditions were considered as part of the trends discussed for the consensus climate forecast and in the significant fire potential assessments for the Eastern and Southern areas (Figures 4 and 5, page 23).

El Niño

Climate anomalies due to El Niño (warmer-than-normal sea surface temperatures in the eastern tropical Pacific Ocean) and La Niña (cooler-than-normal) are well-known and are routinely used to predict seasonal temperature and precipitation trends as far as six to nine months in advance. On average, these climate anomalies are particularly strong in Florida, the northern Gulf Coast, and the Southeast Atlantic Coast. During the winter months, El Niño typically brings plentiful rainfall (averaging 40 percent more than normal) and cooler temperatures to Florida and the Southeast. Conversely, La Niña is associated with warm and dry winter and spring seasons in the Southeast and can lead to wildfire seasons where acreage burned is at least double the average.

While sea surface temperatures (SSTs) warmed by 1°C in the central Pacific near the International Date Line during the past several months, the progress towards an El Niño episode has slowed and there has been no further eastward spread of warm SSTs during the last several months. Ocean temperatures in the eastern Pacific near the coast of Peru (a key region of El Niño activity) remain cool or close to normal. Cool upwelling remains strong and fishing is productive, the opposite of the warmer waters and drastically reduced catches usually characteristic of an El Niño.

In addition, there has been no increase in thunderstorm activity over the affected area of the tropical Pacific. The warmer sea surface temperatures that are characteristic of El Niño usually contribute to increased convection (rain, clouds, and thunderstorms) over the central and eastern tropical Pacific, thereby triggering changes in the global circulation patterns. This increased convection has thus far failed to materialize.

In short, there has been a weak El Niño in place over the west-central Pacific during the past few seasons (though not agreed upon by all climatologists), but there has been no indication that this episode has been related to any U.S. atmospheric anomalies thus far. Further, forecasts call for the weak El Niño to wane in coming months. An ENSO event, whether it was an El Niño or a La Niña, would likely have the greatest impact in Florida and portions of the Southeast.

Forecast Skill

This is the fourth effort to produce a consensus forecast by combining forecasts from different organizations (see Brown 2002; 2003, Brown et al. 2002; 2003). Quantitative skill results are not being offered at this time, because of the small sample size of the forecasts. A qualitative assessment of the 2004 NSAW Eastern and Southern States forecast skill was presented at the meeting. Forecast skill has been established for the model inputs, and it is likely that the consensus forecast skill would be equal to or slightly larger than individual forecast models, depending on the region and the number of inputs in agreement.

Climate consensus forecast contributors: Tim Brown, Scott Goodrick, Daniel Graybeal, Deborah Hanley, Ed O'Lenic, Kevin Scasny, and David Zierden

3. Wildland Fire Outlook: Southern Area

Summary

No significant long-term trends for widespread dry conditions are evident. However, there are currently pockets of drier-than-normal areas in Florida, Texas, and the Carolinas. This, combined with the large amount of increased fuel loading due to hurricane damage, produces several areas of concern for the current fire season. At this time, the Florida peninsula is the only area predicted to have above-normal significant fire potential (Figure 1, page 21) because of the large amount of fuel loading due to storm damage and the below-average precipitation forecast for the fire season. Our confidence in this assessment is moderate to high.

Recent Conditions

The last year has seen average to above-average rainfall in most parts of the Southern region (Figure 5, page 23). One of the major weather influences during the past year was an unusually active tropical season that saw five hurricanes make landfall in Florida and the Gulf Coast. These storms brought copious amounts of rainfall to the peninsula of Florida, Alabama, Georgia, the Carolinas, and other Southern states to a lesser degree.

The early winter and fall seasons also brought a persistent weather pattern that spawned several slow-moving low pressure systems. These brought widespread rainfall to Texas, Louisiana, and Arkansas. Current conditions that were considered for this assessment include rainfall patterns and anomalies, various drought indices, and subjective analyses of moisture conditions in recent months and over the last year.

Total annual precipitation across the entire Southern area was consistently average to above average in 2004. Tropical rainfall during autumn (September–November) included large areas with precipitation values more than 200 percent of normal over most of the area.

The 30-day precipitation analysis for December 2004 shows short-term rainfall deficits beginning to affect the Southern region (Figure 4, page 23). These short-term deficits are of little concern to most of the region, where low winter evapotranspiration rates will slow drying of fuels and soils. Potential problem areas are South Florida, which missed out on most of the tropical rainfall, and coastal areas of Georgia and South Carolina.

Drought Indices

The Palmer Drought Severity Index (PDSI) is perhaps the best known drought index in the United States. The PDSI responds to rainfall surplus or deficits on a mid- to long-range time scale and is indicative of deep soil moisture and surface water. The January 15, 2005 PDSI reflects the plentiful precipitation that the Southern region has enjoyed recently (Figure 5). All climate divisions have values ranging from near normal to extremely moist.

The U.S. Drought Monitor (see web references) for January 18, 2005, shows the entire Southern region as free from drought, although South Florida is identified as “abnormally dry.” In fact, the Southern region has been relatively drought-free over the last 12 months with only minor, brief exceptions.

The drought index most widely used by the forestry and wildfire sectors is the Keetch-Byram Drought Index (KBDI), which is a surrogate for moisture in the upper layers of the soil. The KBDI responds much more quickly than the PDSI to recent weather, especially rainfall events. The current KBDI analysis for part of the Southern area highlights the recent dryness in Florida, with values exceeding 500 and 550 in South Florida and the west coast north of Tampa (Figure 6, page 24). Winter and spring are the dry season for the peninsula and elevated KBDI values are to be expected. However, 500 and above are on the high side of normal in South Florida and certainly indicate dryness further north. There is the potential for worsening conditions in this area (Figure 7, page 24) as the dry season progresses and temperatures rise in the spring. The rest of the Southern states, including those not shown in Figure 6, are all quite moist on the KBDI scale.

Fuel Conditions

The current dead and live fuel moistures for much of the Southern area are normal for this time of the year. However, there are pockets of slightly drier areas in the region such as the southern tip of Florida, and coastal areas of Texas, and Louisiana. Florida is currently the area of greatest concern for the 2005 fire season. There are increased fuel loadings due to hurricane damage. Roughly 20 million acres were significantly affected in Florida and Alabama. There are also pockets with increased fuel loading stretching from Florida westward to Mississippi, northward to the Appalachian Mountains (Virginia) due to blowdown of trees killed earlier by southern pine beetles. This blowdown was caused by the four hurricanes that made landfall during August and September of 2004.

The long-range forecast for Florida indicates a slightly below-average level of precipitation during the upcoming fire season. This could lead to above-normal fire potential for the state, due to the increased fuel loading. The areas impacted by the hurricanes created large amounts of dead and downed material. This will not only impact fire behavior but also influence firefighting tactics. Fire behavior will likely be most influenced by an increase in fire line intensities and spotting. As of mid-January 2005, Florida and South Texas are beginning their fire seasons. Frequency of precipitation is important in keeping fire potential in check. Long stretches of time without precipitation will cause a significant increase in fire potential. This is especially important in these areas of increased fuel loading. If these areas go 10 to 14 days without measurable precipitation, fire behavior will be greatly increased (Table 1, page 6).

The KBDI in south Florida and north central Florida is currently at the high side of normal. This is a concern because these values are occurring at the beginning of the fire season, and below-average precipitation is expected for the remainder of the fire season. The Appalachian Mountains to the coastal plains in the Carolinas and the Texas gulf coast have slightly higher-than-normal Energy Release Component values. Also, in these areas the moisture values in downed logs and large debris (1000-hour dead fuel) are running slightly below normal. Although values in these areas are still moist, they are trending toward the dry side for the start of fire season.

Climate and KBDI forecasts

In the absence of a strong El Niño signal (see page 8), weaker climate patterns begin to play a dominant role in southeastern climate, particularly the Pacific North American pattern (PNA) and North American Oscillation (NAO). The PNA establishes a pressure dipole between the Pacific Northwest and the Southeast, with a positive PNA indicating lower-than-normal pressures (and therefore more precipitation) in the Southeast while the negative phase leads to higher pressure (and therefore less precipitation). For fire weather purposes, the negative PNA phase is the primary concern, as enhanced high pressure over the region limits rainfall and enhances deep layer atmospheric drying, a potential mechanism for some isolated fire episodes.

The NAO, when in its positive phase, can also act to enhance high pressure in the southeastern United States. During March and April of 2004, both the PNA and NAO enhanced the high pressure ridge across the region, leading to an outbreak of fire activity in the Southeast. These two indices vary over much shorter time scales than ENSO and therefore are difficult to predict on a seasonal basis. They should be monitored on a regular basis to help anticipate any short-term outbreaks of fire episodes this year.

The outlooks for the February–April and March–May periods indicate cooler-than-normal temperatures over most of the southern states. Also, below-average precipitation is likely to continue over south and central Florida (Figure 3, page 22). The forecast is for enhanced probabilities of warmer-than-average temperatures in April–June with dryness expected to continue over south Florida in the early months of spring. There is no clear indication for moist or dry conditions to persist in the May–July period over the Southeast, so there is no expectation at this time for a delay in the start of the summer wet season. Warmer-than-normal temperatures are projected for May–July in the entire Southeast region, with the highest increase over extreme South Florida.

Florida is the primary area of concern. This area is currently drier than the rest of the Southern area, with no significant indicator pointing towards a significant wet period to provide substantial relief. An increased probability of above-average temperatures in the May–July period may lead to enhanced drying during this period and elevated fire potential. Florida State University's KBDI Potential Forecast indicates above normal potential for the KBDI to exceed 600 in southern Florida during May 2005 (Figure 7, page 24).

Fire Potential and Resource Outlooks

The year 2004 ended with the Southern area having 83 percent of average fire starts and 67 percent of the average annual number of total acres burned. The Southern area experienced an increase in activity in March, especially in the coastal plains, but this ended about the third week of April. The remainder of the 2004 fire season had below-average activity for all of the Southern area. Based on the current climate forecast, we expect that the fire activity for calendar year 2005 has the potential of increasing over last year, due to the projected drying in South Florida. The fuels in South Florida are light and prone to rapid spread rates, which could lead to larger fires on average.

The primary fuels management concerns in the Southern area for the coming calendar year are for Florida, Alabama, and the Appalachian Mountains. The amount of hurricane debris from the 2004 storms will create a significant wildfire suppression problem. The concerns fall into three areas:

1. The additional fuel will have the potential to ignite the underlying organic fuels if any kind of drying occurs; thus, there is an increased potential for organic soil fires (peat or muck fires).

2. The wildfires and prescribed burns in the blowdown areas will be more intense due to the increased fuels available to the fires. This can result in increased lofting of larger fire brands outside the wildfire or prescribed fire perimeter.

3. The potential for spot fires will increase, especially as humidity drops below 35 percent.

Wildfires are not expected to spread any faster than usual due to increased debris in the storm damage areas. However, we expect that these fires will burn larger areas, due to problems accessing fires within blowdowns, and increased spotting that could start more fires. The majority of the suppression units in Florida do not have the power to move through the downed hurricane debris. The additional concern here is for firefighter safety. The reduced ability to maneuver and the increased potential for spotting can set up a situation where suppression crews could get trapped without an escape route. Fires that occur in areas of considerable downed debris will require heavier tractors (D-6/JD650 types or larger) in order to more safely maneuver.

Management Implications and Concerns

Fire management is anticipated to be routine in most of the Southern area, with the exception of those areas containing the heavier fuel loads from the 2004 tropical storms (Florida, parts of Alabama, and the Appalachian Mountains). These areas, if the anticipated spring weather forecast is accurate, can generate above-normal fire intensities with mop-up requirements that will tax local fire suppression resources. Exceptions have been noted for West Texas and North Carolina also.

Heavier tractors will be required in the blowdown areas, as the lighter tractor/bulldozers will not be able to push through the heavier piles of downed trees. Some concern has been noted for east and south Texas because of the precipitation deficit in December. The climate forecast projects this area will receive above-average moisture over the next six months, so this precipitation deficit is expected to be relieved.

North Carolina is mentioned due to the increased fuel loading that has occurred in the state's Northeastern Coastal Plain counties (from Hurricane Isabel in 2003) and the North Central Piedmont counties (January 2004 winter ice storm damage). These areas, if the anticipated spring weather forecast is accurate, can generate above-normal fire intensities with mop-up requirements that will tax local fire suppression resources.

Another concern in these storm-damaged areas involves debris burning. For example, historically in Florida the largest cause of fires in January and February is debris burning. The increase in dead and downed material will likely increase the number of people burning debris.

In summary, the Southern area is expected generally to have a normal fire season in 2005 (Table 2). However,

Table 2. Different scenarios for the projected likelihood of significant fire potential in the Southern area.

Scenario description for the 2005 fire season	Probability
Most Likely Scenario Dry pattern continues in Florida and fire activity will be normal to slightly above normal in Florida and normal for the rest of the Southern area.	80%
Best-Case Scenario Wet pattern begins, leading to minimal fire activity throughout the Southern area.	10%
Worst Case Scenario Large scale drying trend develops, leading to above-normal fire activity across the Southern area.	10%

there are significant areas of concern as outlined above. A high frequency of rainfall events will be vital to maintaining a low significant fire potential in the areas with storm damage. If these areas lack rainfall in the course of a week or two, then fire intensity and spotting of resulting fires will increase. If this occurs, fire activity may dictate the need for an organized response across the Southern area. Fuel and weather conditions should be closely monitored in these areas. Fire managers should be aware of significant drying trends which could lead to increases in fire activity and behavior. The large quantity of downed material may require fire managers to reassess traditional suppression tactics.

Southern area outlook contributors: Jim Brenner, Daniel Chan, Clint Cross, Gary Curcio, Barry Garten, Scott Goodrick, Deborah Hanley, Kevin Scasny, and David Zierden

4. Wildland Fire Outlook: Eastern Area

Summary

Below-normal significant fire potential is expected for the spring for the Mid-Atlantic region and a small portion of the Northeast region of the Eastern area (Figure 1, page 21). Elsewhere in the area, significant fire potential is expected to be normal.

The majority of the Mid-Atlantic and the southern Northeast compacts (delineated in Figure 2, page 21) received near to above-average precipitation through much of 2004, which kept fire occurrence below normal over these areas during last year's fire seasons. The northern part of the Northeast Compact received near- to above-average precipitation through the latter third of 2004 into early 2005 (Figure 4, page 23).

The consensus climate forecast (Figure 3, page 22) indicates the possibility of below-average precipitation across the majority of these areas through April 2005, and over the northern Mid-Atlantic and Northeast compacts from the spring into the summer months (Figure 3). Despite these forecasts, below-normal fire potential has been forecast across the Mid-Atlantic and southern Northeastern states through April, due to the long-term positive precipitation anomalies which were in place towards the end of January 2005 (Figure 5, page 23). Short-term weather trends will continue to be monitored for fire potential due to the fuel types in place over this region.

This outlook was compiled with the most recent weather and climate data available toward the end of January 2005, and is an estimate of expected conditions for late winter and early spring in the Eastern area.

Recent Conditions

Over the 30 days leading up to January 18, 2005, parts of Minnesota and Iowa received slightly below-average precipitation while the southeastern two-thirds of the Big Rivers and northern two-thirds of the Mid-Atlantic compacts received above-average precipitation (Figure 4). The 90-day period preceding January 18, 2005 was similar to the 30-day pattern but less pronounced.

Twelve-month Standardized Precipitation Index (SPI) maps (see web references) indicate that the wetter-than-average conditions decreased across the eastern Mid-Atlantic states when comparing the SPI maps ending in December 2003 and 2004.

Extremely wet conditions across sections of the Northeast also fell back toward average at the end of December 2004 compared to the previous year. Meanwhile, conditions went from slightly dry to slightly wet over portions of the western Great Lakes during this same time span.

Fairly frequent and significant precipitation events throughout much of 2004, over much of the Mid-Atlantic and southern Northeast compacts, continued to ameliorate the effects of the 1998–2002 drought.

The aforementioned areas received near- to above-average precipitation through the latter portion of 2004, which allowed the long term wetter-than-average conditions to remain in place towards the end of January 2005. Meanwhile, parts of the western Great Lakes and northwestern Big Rivers compacts exhibited precipitation deficits by the close of 2004 and into early 2005.

Drought Indices and Snow Cover

The long-term Palmer Drought Severity Index (PDSI) reflects the areas where the highest precipitation anomalies are in place (Figure 5, page 23). Much of the eastern Big Rivers, Mid-Atlantic and southern New England state compacts are recording high levels of moisture. The U.S. Drought Monitor (see web references) also reflects that the entire Eastern area was drought-free as of January 18, 2005 although portions of Minnesota and Iowa are considered "abnormally dry."

Soil moisture anomalies can be used as a valuable indicator of the possibility of fire ignition, as well as incident longevity. The 12-month soil moisture deficits included large portions of the Big Rivers and eastern Great Lakes regions at the beginning of 2004 (Figure 8, page 25). By the end of 2004, soil moisture deficits had contracted to a smaller area, centered on the southwestern tip of Iowa (Figure 8).

The greatest snow depth in the area as of January 19, 2005, was found over eastern Iowa, however (Figure 9, page 25). Starting in late January 2005, a series of low pressure systems produced additional precipitation over the northwest Big Rivers, northwestern Mid-Atlantic, and western Northeast compacts.

Fuel Conditions and Assessment by Compact

It is difficult to assess fuel conditions at this early date. When it comes to fire activity, fuels are responsive to short-term weather variations rather than seasonal trends. Discounting the potential for major fires during the spring would, however, be a serious mistake. Fire frequency peaks during the spring, due to the abundance of fine dead fuels and the absence of live green fuels. These fuels are readily available and respond to short-term variations in weather that cannot be reliably inferred from the national situation, including consensus forecast products.

Vegetation types that are grass-dominated or that grow on thin or sandy soils respond to even short-duration drying and are prone to burn aggressively in otherwise normal periods. This area of concern represents less than 10 percent of the total acreage in the Eastern area, located largely on Cape Cod, Long Island, the New Jersey Pine Barrens, the Del-Mar-Va peninsula, and the northern Great Lakes. However, they are interspersed with widespread urban interface communities.

Great Lakes and Big Rivers
In Minnesota, 2004 was a warmer-than-average year, with precipitation much above average in many places. A few locations in the southeastern part of the state reported precipitation in excess of 45 inches for the year. All of the state went into winter with average to above-average fuel moistures.

As of January 3, 2005 snowfall in the Twin Cities area was the lowest in 114 years. As of January 19, 2005 a significant portion of central and southern Minnesota had very light snow cover, if any. Northern Minnesota, on the other hand, received average to above-average snowfall for this time of year.

Lack of snow cover in the central part of the state has caused frost to drive deep into the soil. This will likely cause much of the snowmelt to run off this spring, with very little soil moisture recharge.

If light snow cover persists over the south half of the state, the likely result will be an early start to the fire season. Where fuels are exposed, due to lack of snow cover, fuel moisture will continue to drop into early spring.

Average to above-average snow cover will keep the fire season on a normal timetable in northern Minnesota. High fuel moistures going into winter will likely remain stable into spring in the north. In the Bemidji/Park Rapids area, jack pine budworm has infested over 43,000 acres, with significant mortality in many stands. Stands that have not been salvaged or otherwise treated by this spring will contribute to an increase in fire potential in that area.

Meanwhile, most of Wisconsin and Michigan have received average to above-average precipitation in the last 12 months. As of January 19, 2005, soil moisture levels were adequate over most of the area. Light snow cover, along with drier-than-average conditions forecast through the spring, may result in an early onset of fire season in parts of southern Wisconsin and Michigan.

The southwestern Great Lakes and the northwestern Big Rivers compacts received below-average precipitation through the early half of 2004; this was reflected in drought indicators and soil moisture anomaly maps available for February 2004 (Figure 8). Although precipitation was below average over the portions of the northern tier of the Great Lakes into the summer of 2004, the region received ample precipitation during the latter third of 2004. Precipitation patterns generally had improved by December 2004 (Figure 8).

Mid-Atlantic
Based upon the weather and climate data available as of January 19, 2005 the early spring season forecast is for normal fire potential. It is difficult to assess fuel conditions at this early date, but the spring fire season in these areas is driven by fine, dead fuels and the factors that influence them. These fuels are responsive to short-term weather variations rather than seasonal trends.

Areas of the compact have experienced anomalous fuels buildup resulting from wind-triggered blowdown and ice storm damage. These loadings will continue to cure and could present an elevated wildfire risk, if exposed to prolonged drying coupled with significant wind episodes.

The precipitation patterns that brought an end to the drought pattern in 2003–04 persisted into early 2005.

These precipitation patterns continue to exhibit average to slightly above-average trends. However, it is important to acknowledge that several days to a week of moderate to high fire danger from dry spells can create fuel conditions that may produce an episode of fires or a major fire, particularly in areas of sandy soils.

Northeast

Based upon the most recent weather and climate data available, the early spring fire season forecast is for normal to below-normal significant fire potential. Prolonged periods of fire activity are not expected through the spring fire season. It is difficult to assess fuel conditions at this early date, but the spring fire season in these areas is driven by fine, dead fuels and the factors that influence them. These fuels are responsive to short-term weather variations rather than seasonal trends.

Following a 5-year drought pattern that ended in the fall of 2002, average precipitation and temperature patterns returned to the Northeast Compact in 2003, and continued through 2004.

Through the course of 2004, precipitation amounts have completely ameliorated precipitation deficits resulting from the drought, and all climate indicators show that the majority of the Northeast Compact is no longer in drought (for example see Figure 5, page 23).

Looking forward through early 2005, average precipitation patterns and snowfall amounts are expected. However, it is important to acknowledge that several days to a week of warm, dry, windy weather can create fuel conditions that may produce an episode of fire activity or a major fire, particularly in areas of sandy soils.

Climate Forecasts

Consensus climate forecasts for the spring of 2005 predict the eastern three-quarters of the Eastern area have a 55 to 60 percent chance of receiving below-average precipitation from February through April, while above-average precipitation is expected for the far western Great Lakes and Big Rivers regions (Figure 3, page 22). Below-average precipitation was forecast for March–May for the northern half of the Eastern area.

Forecasters predict below-average temperatures over the eastern half of the Eastern area for February–April. Below-average temperatures are forecast for the southern half of the Big Rivers as well as the Northeast and Mid-Atlantic compacts for March–May. Finally, above-average temperatures were forecast for the southeastern Mid-Atlantic, including the extreme northern and coastal areas of Maine for May–July 2005.

Negative precipitation and snow depth anomalies and levels of drought were fairly prominent over parts of the southern half of Minnesota and western Iowa. These areas may experience an earlier-than-normal start to the spring 2005 fire season, if forecasts for higher-than-average chances of above-average precipitation do not turn out.

ENSO Discussion

The El Niño Southern Oscillation (ENSO) through the winter of 2004–05 has been in a neutral to weak El Niño state, and is forecast to remain in this state into the spring of 2005. No significant climatic impact signatures are associated with this neutral-to-weak El Niño state, during this outlook period and across the Eastern area (see page 7 “Climate Forecasts”).

Using previous analog or similar sequences of years representing La Niña episodes followed by a neutral to weak El Niño, composite temperature and precipitation trends can be compiled and analyzed to forecast possible trends for the late winter and early spring of 2005. These analog years at the end of similar ENSO patterns were entered into a Climate Diagnostic Center program that displays temperature and precipitation anomalies within each climate division. The Eastern area results for February–April (Figure 10) support the climate consensus forecasts for February–April (Figure 3) fairly well except for the warmer-than-average temperatures across the northwestern half of the Eastern area.

Fire Potential and Resource Outlooks

Historically the Eastern area does not import large amounts of fire management resources. However, based upon information as of January 19, 2005, the spring 2005 fire season across portions of the southwestern Great Lakes could begin earlier than normal if below-average snow depths persists over these areas. If these below-average snow depths/snow amounts are not alleviated through the remainder of the winter months grasses will not be compressed and will remain standing. These fine fuels will then be readily available for ignition after the snow melts and may create a higher resource need if short-term periods of high fire danger occur before green-up.

Fires in the peat soil areas may also be very problematic if springtime rainfall events/amounts are minimal. Without strong indications for above- or below-normal wildfire potential, there may be increased opportunities for prescribed fire, mainly in the northern and western portions of the eastern area. Conditions throughout the area could also allow for sharing of resources with the rest of the country.

Eastern area outlook contributors: Joe Kennedy, Daniel Graybeal, Karma Kanseah, Steve Marien, Steve Maurer, Doug Miedtke, and Don Scronek

5. Recommendations

A variety of recommendations surfaced at NSAW Eastern and Southern States. Some of these are outlined below, although the priority is not necessarily reflected by the order in which they are given.

Recommendations for Organizers

- Expand the geographic region covered by the workshop to include parts of Canada. In some cases, particularly in the Northeast region, the political boundaries between Canada and the United States have little relation to the potential influence on significant fire potential.

- Provide a more explicit set of guidelines to follow, particularly when instructing participants about the type of information to bring to the workshop.

- Distribute the participant list ahead of time so everyone will know which states will be represented at the workshop. This will allow those in adjacent states to gather information from states not represented in person at the workshop. Ideally, every state should send a fuel specialist. This could be feasible if the participants' home agencies can cover all or part of the transportation and lodging costs of designated participants.

- Continue providing background on climate patterns and predictions by inviting experts in the field to present information at the workshop.

- Create a manual compiling background on climate patterns and products. The manual should include an acronym sheet describing the terms climatologists use, such as "PDO" (Pacific Decadal Oscillation) and "PNA" (Pacific North American) patterns.

- Hold the 2006 workshop in the same location as it was held in 2005, at the U.S. Fish and Wildlife Service's National Conservation Training Center in Shepherdstown, West Virginia.

Recommendations for Participants

- Produce explicit fuel maps documenting the areas of potential risk given current conditions of fuels (as best known at the time of the workshop, given the time restrictions and deadlines involved).

- Create a database of the number of fire starts and amount of acres burned from each individual state or compact that could be combined into a regional whole. In some areas, the area-burned values reported values may be off by 25 percent, one workshop participant noted, which makes it difficult to compare fire years to climatic conditions and to verify the accuracy of the seasonal forecast of significant fire potential.

- Compile a "master list" of potential participants, especially fuel specialists, who could contribute to the seasonal forecast workshop. This list will be used to assist organizers in improving coverage of some states and areas.

- Arrange a time in advance to consult by conference call with fuel specialists from states that are not represented in person at the workshop.

Recommendations for Climatologists

- Create climate products that better quantify specific topics of interest to fire managers, such as the probability of events occurring during certain time frames. For example, Florida fire managers would like to know the likelihood of getting 14 consecutive days without rain during the spring fire season.

- Refine the experimental snow cover product created by the Northeast Regional Climate Center so that Snow Water Equivalent is also considered. The product was created in response to last year's workshop, during which participants requested information portraying snow data as departures from average.

- Divide the seasonal forecasts, typically lumped in three-month groups, into individual months.

- Follow a consistent verification technique to test the extent to which the previous year's climate forecast succeeded. Ed O'Lenic of NOAA's Climate Prediction Center offered to assist in this effort.

6. Conclusions

Judging from the interactions at the 2005 National Seasonal Assessment Workshop Eastern and Southern States, the consensus process was working well and providing information that is useful for managing firefighting resources.

Goals

Workshop goals that were met included:

- Creating a comprehensive seasonal significant fire potential outlook for the Eastern and Southern geographic areas.
- Fostering communication and enhanced information flow among fire managers in different states and at the federal levels.
- Helping fire managers understand the values and limitations of climate forecasts.
- Providing feedback to climatologists about how existing or potential products could be modified to better meet the needs of the nation's fire managers.
- Gathering feedback on the usefulness of the NSAW products.
- Devising recommendations that will continue to improve the workshop process and resulting outlooks.

Communication and Cooperation

The 2005 workshop contained many interactions fulfilling the goal of encouraging fire managers from different states and areas of specialty to share information. In one instance, a forester who fought fires in the 1999 Boundary Waters blowdown area alerted Florida managers that debris pockets from hurricane blowdown could be expected to not only burn hotter but also to shoot out sparks that could start new fires beyond the typical fire perimeter of concern. In both states' blowdowns, downed trees jackknifed into debris piles that resembled a "pick-up sticks game," in the words of one Florida observer.

In another case, fire managers exchanged information on how resources might be distributed or shared during the coming season. When Florida fire managers reported a potential need for large bulldozer-style equipment (D-6/JD650 types or larger) to get to fires blocked by jackknifed piles of downed trees, a North Carolina manager responded by noting he might have some of the essential equipment to spare for Florida's use, based on the forecast of below-normal potential for a significant fire season in North Carolina. Similarly, a West Virginia forest manager indicated his state would expect to send firefighters and resources to Florida and South Carolina to help out during the season.

Climate and Fuel Interactions

Several of the fuel specialists and land managers at the meeting enjoyed hearing about the values and limitations of climate forecasts as described in the three climatology talks, by National Oceanic and Atmospheric Administration's Ed O'Lenic, David Zierden of Florida State University's Center for Ocean-Atmospheric Prediction Studies, and Dan Graybeal of the Northeast Regional Climate Center. The NOAA presentation included maps illustrating the success (or lack thereof) of previous Climate Prediction Center forecasts by season, which was particularly appreciated by the group. O'Lenic also volunteered to do a verification analysis of the climate consensus forecast in future years, if desired.

Graybeal's presentation included an experimental snow cover map that he developed in response to a request made during the 2004 workshop. The map showed how this year's snow depth was generally low compared to previous years (1971–2000), based on stations with at least 20 years of data (Figure 9, page 25). In response to his request for additional feedback, participants suggested that snow-water equivalent data would be useful for fuel moisture models. They also suggested producing a map illustrating the average beginning date of the snow-free season, because the fire season can start within a few days of snowmelt.

Another product suggested by participants involved illustrating spatial variations in ground temperatures, which influence whether or not snow will recharge soil moisture. Frozen ground will allow most moisture to run off. At the other extreme, hot days during the snow season can lead to sublimation, when snow evaporates directly into the atmosphere without leaving moisture behind.

Fire managers also requested more information on annual variability in precipitation timing and intensity. Florida fire specialists said they would like to know the probability of getting clusters of dry days during the fire season. Zierden agreed to conduct analyses on these historical data, dividing years by El Niño/La Niña phases as well. The number of acres burned from wildfires in Florida can increase threefold during La Niña years, he noted, while the number of starts may increase fivefold or even tenfold.

Members of the Southern area also indicated that they found the forecasts of the Keetch-Byram Drought Index (KBDI) developed by Zierden and his colleagues at Florida State University (see Figure 7, page 24) to be useful when projecting significant seasonal fire potential. Last year's workshop group had requested the product, and this year's group was happy to see it operational in 2005. The KBDI, an estimate of moisture in the upper layers of the soil, is the drought index that is most widely used by forestry and wildlife managers.

Usefulness of NSAW Products

Workshop participants also shared feedback on how they have used the National Seasonal Assessment Workshop products, such as previous versions of this report. Based on that discussion, the workshop products have been used for the following purposes:

- To inform fire chiefs and firefighters about the significant fire potential during the coming season, including the many volunteers who assist in suppression efforts on a call-when-needed basis.

- To predict whether and when firefighters and resources will be available to respond to national mobilizations.

- To better plan the timing of prescribed burns for the coming season.

- To assist in decisions of whether firefighters will be likely to have the opportunity to participate in seasonal training programs, conferences or workshops.

- To provide insight on budgetary matters, such as whether the money set aside for firefighting should remain untouched as belts tighten at the end of the fiscal year.

- To inform the public, such as helping to make stakeholders aware of the reasons for the timing of prescribed burns or debris-burning restrictions.

Thus, the third NSAW workshop covering the Southern and Eastern areas closed with a sense that members are moving forward in their goal to continue improving on their ability to forecast the significant fire potential in the coming season.

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Standardized Precipitation Index
http://www.wrcc.dri.edu/spi/spi.html

National Drought Mitigation Center
U.S. Drought Monitor
http://www.drought.unl.edu/dm/monitor.html

NOAA Climate Prediction Center

- Palmer Drought Severity Index
  http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml
- Plotting and Analysis Pages
  http://www.cdc.noaa.gov/USclimate/USclimdivs.html
- Preciptation Monitoring
  http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh
- Soil Moisture
  http://www.cpc.ncep.noaa.gov/soilmst/w.html

Southeast Climate Consortium
Keetch-Byram Drought Index Forecast
http://www.agclimate.org (select “Forestry” link)

Southeast Regional Climate Center
Keetch-Byram Drought Index
http://www.sercc.com/climateinfo/drought.html

8. Figures

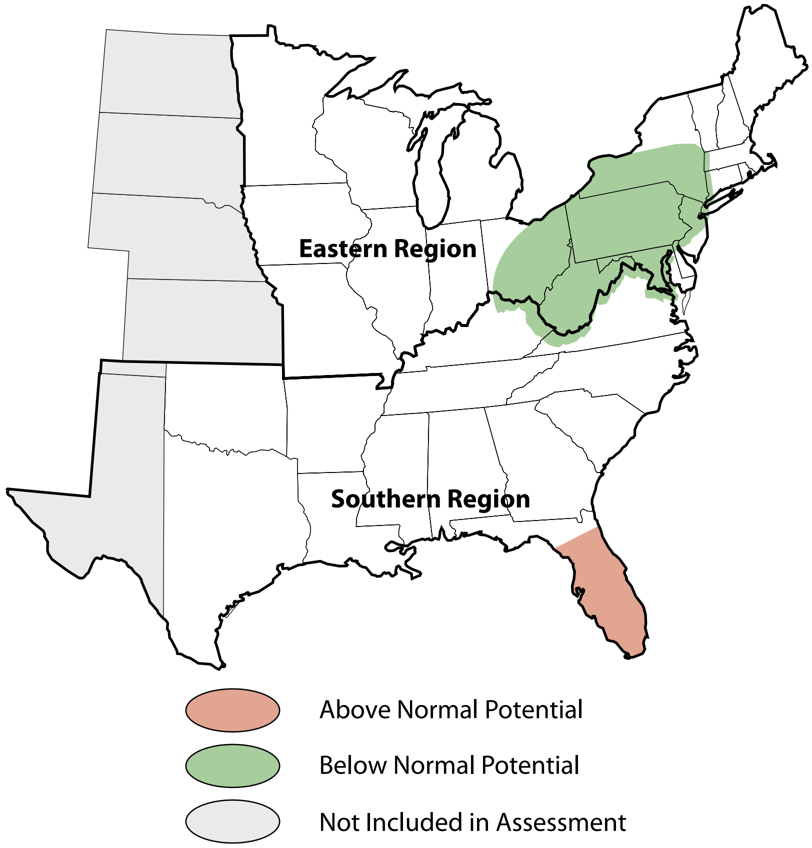

Figure 1. Outlook for significant fire potential for the Eastern and Southern geographic areas for February through July 2005.

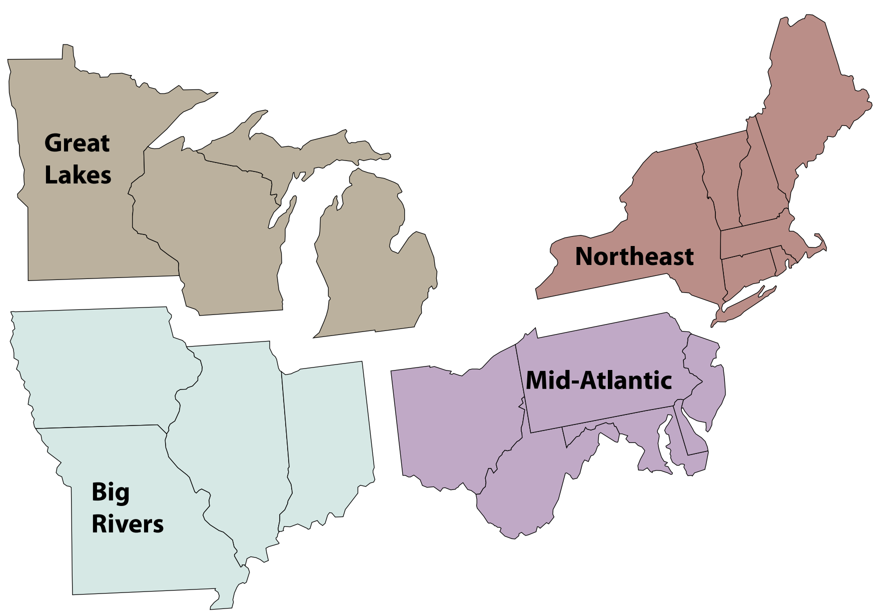

Figure 2. The Eastern area is split into four compact areas, as shown above.

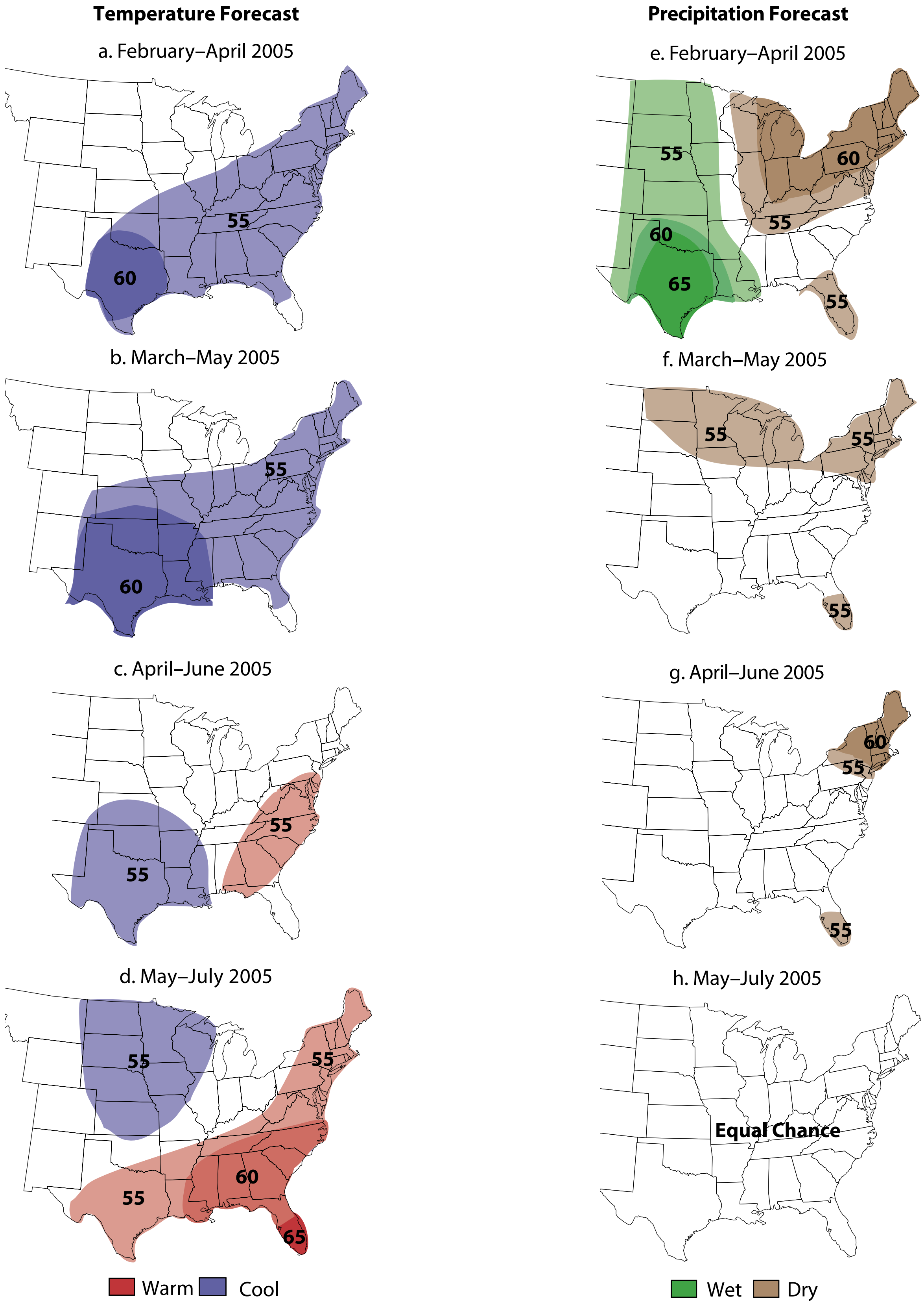

Figure 3a–h. Consensus temperature and precipitation forecasts developed for the workshop. The numbers on the maps represent the probability of occurrence of above-average (wet or warm) or below-average (dry or cool) temperature and precipitation. The graphics illustrate probability forecasts for three months at a time, moving forward in time.

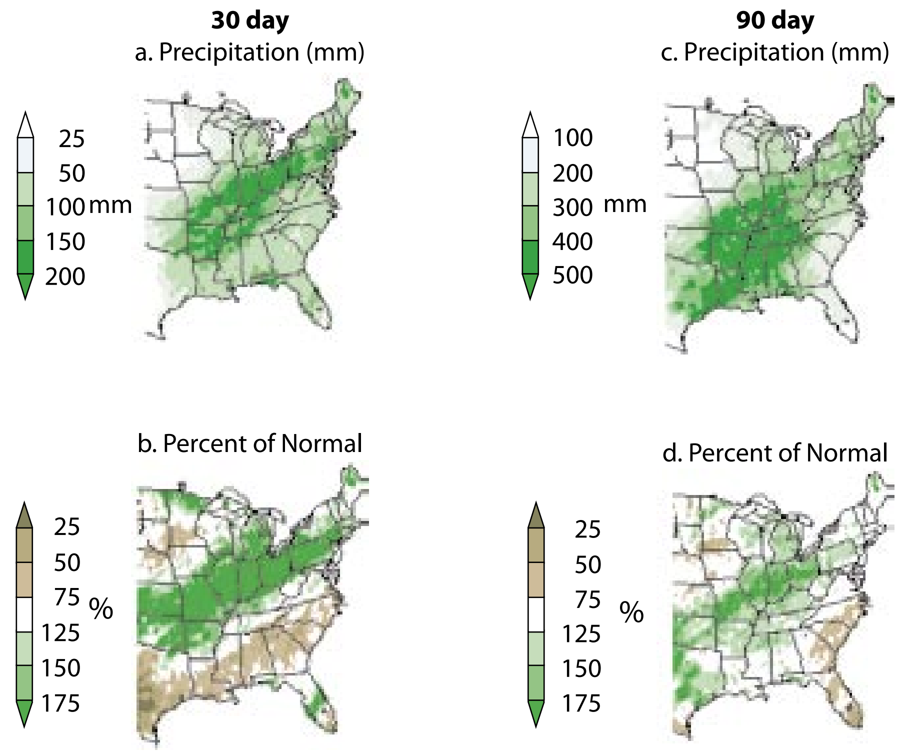

Figure 4. Accumulated precipitation for the 30-day (left) and 90-day (right) periods ending January 18, 2005. The topmost figures show actual total precipitation for the period of interest. The bottom figures show precipitation as a percent of normal. Source: NOAA Climate Prediction Center (CPC).

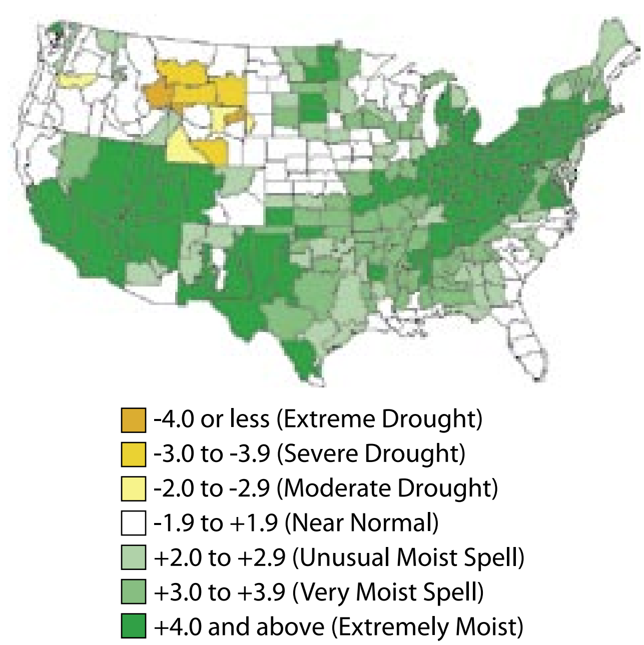

Figure 5. Weekly Palmer Drought Severity Index for the period ending January 15, 2005. The index expresses long-term drought severity. Source: NOAA CPC.

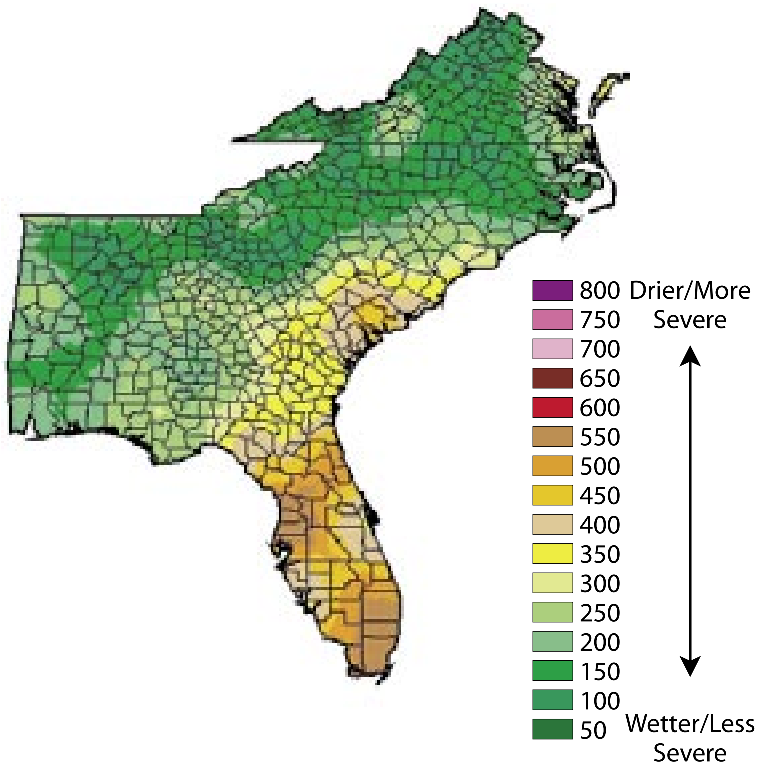

Figure 6. Keetch-Byram Drought Index (KBDI) values as of January 15, 2005. The KBDI, a surrogate for upper-layer soil moisture, is the drought index most widely used by foresters. Source: Southeast Regional Climate Center.

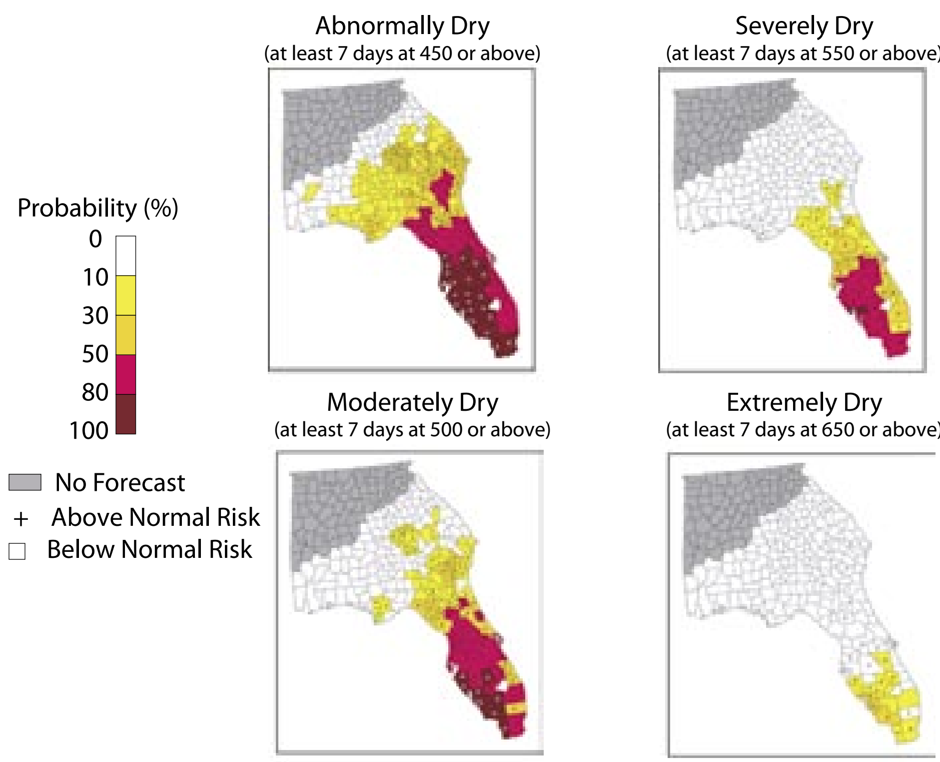

Figure 7. Keetch-Byram Drought Index (KBDI) values predicted for May 2005. This relates to the Southern area outlook, described in section 3. Highlighted areas indicate the probability that the area will have the risk described, such as “moderately dry” or “extremely dry.” Source: Southeast Climate Consortium.

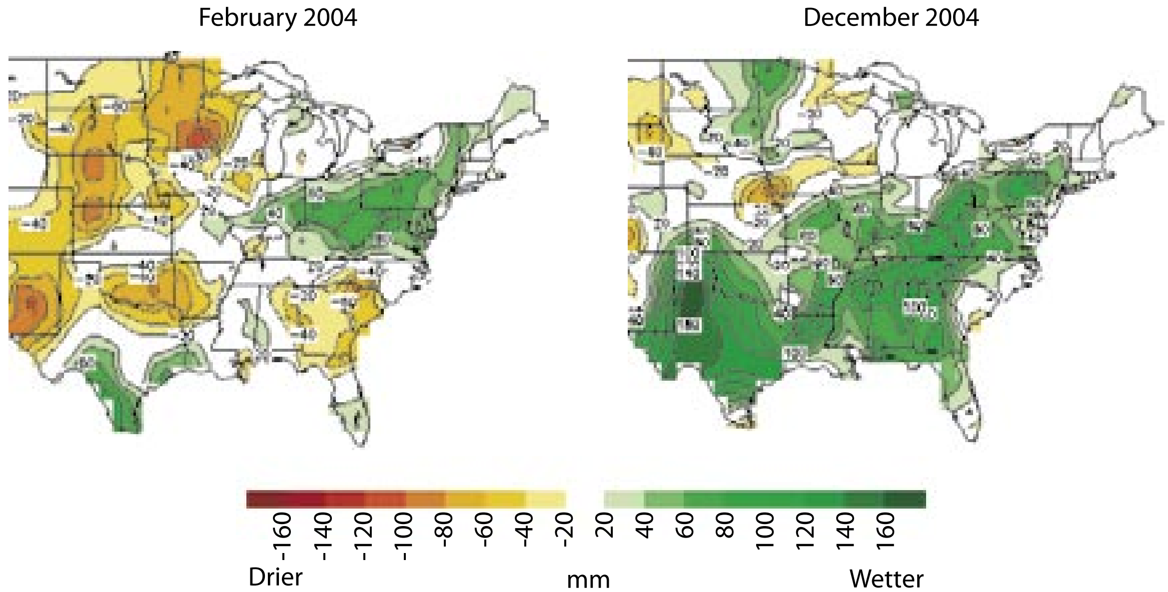

Figure 8. Soil moisture departures from the 1971–2000 average for the 12-month period ending in February 2004 and December 2004. The scale shows the difference, in millimeters of soil moisture in the top 1.6 meters of soil, for the previous 12 months compared to the 30-year mean. Source: NOAA CPC.

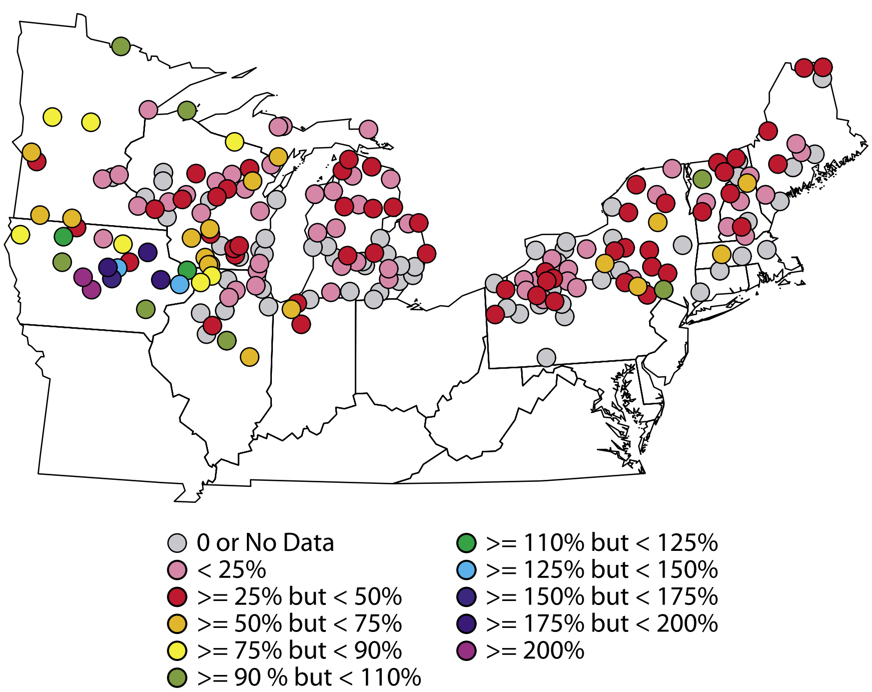

Figure 9. Dots show the percent of average snow depth as of January 16, 2005 compared to the 30-year climatological average (1971–2000). This is an experimental product. Source: Dan Graybeal, Northeast Regional Climate Center.

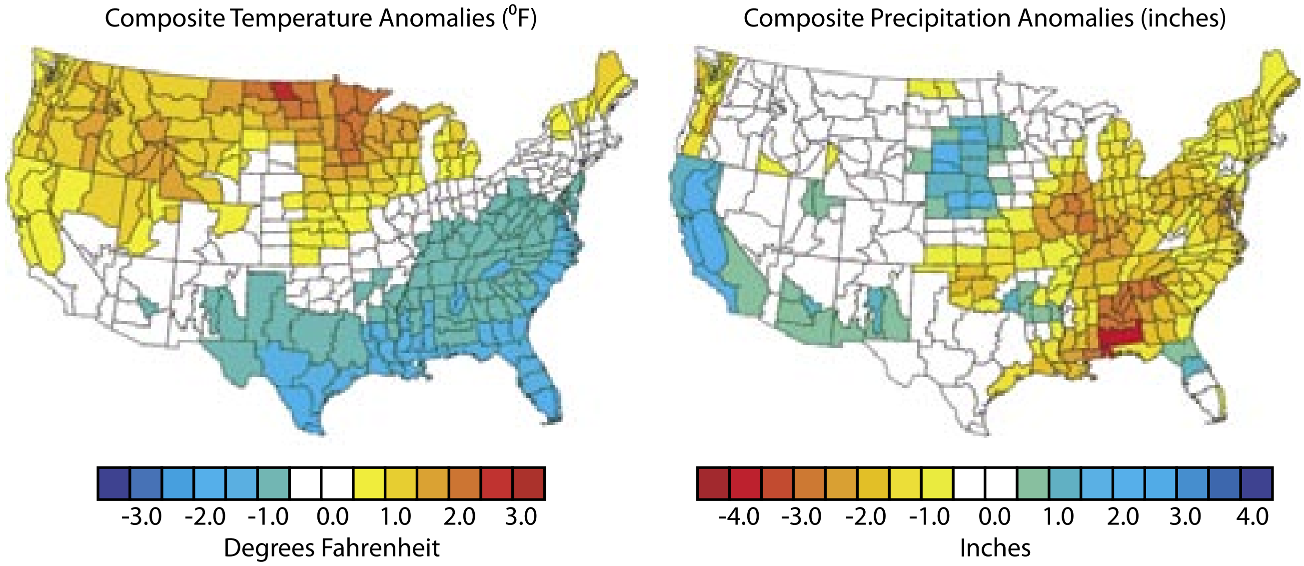

Figure 10. Comparisons of February–April temperature in degrees Farenheit (left) and precipitation in inches (right) show departures from the 1971–2000 average for weak-to-moderate El Niño episodes. The years compared are 1958, 1968, 1977, 1978, 1986, 1987, and 1991. The choice of episodes is based on the judgment of the Eastern area Coordination Center fire weather meteorologist using a program of the NOAA-CIRES Climate Diagnostic Center.

Appendices

Appendix A: Seasonal Wildland Fire Assessment Report Outline and Protocols

A. Executive Summary

1. A specific forecast statement (i.e., "the bottom line") should be explicitly included in the executive summary and final summary and recommendations.

2. A statement of the expected range of possibilities (scenarios) for the season.

3. Include a statement about your confidence in the forecast. Mention why you do or do not have confidence, based on your assessment of the various tools used in your forecast.

B. Introduction and Objectives

1. Include guidelines for use of the report and a disclaimer.

C. Current Conditions (including comparison with historical records)

1. Snow (NOHRSC data, SWE, others).

2. Precipitation anomalies (recent week, month, water year).

3. Temperature anomalies (recent week, month).

4. ENSO & other climate indices impact on weather and atmospheric circulation.

5. Weather and atmospheric circulation.

6. NFDRS, Fire Danger, and other fire potential indicators.

7. Drought indices and maps (PDSI, SPI, KBDI, soil moisture, groundwater, etc.).

8. Vegetation status (NDVI, Greenness imagery).

9. Fuel moisture (live, dead and foliar if known).

10. Fire occurrence data (number, size, duration if known for current year).

11. Fire behavior observations and/or Farsite run comparisons (if appropriate).

D. Climate and Weather Outlooks

1. Long-range climate outlooks (NOAA-CPC, IRI, Scripps, others).

2. Projected atmospheric circulation.

3. ENSO and other relevant index forecasts.

4. Drought forecasts (including NCDC drought amelioration).

5. Soil moisture forecasts.

6. Fire weather indices.

E. Fire Occurrence and Resource Outlooks

1. Estimates on number of fires (based on historic lightning episode information, acres burned, duration, Scripps/Westerling model, others).

2. Estimates of expected resource needs.

F. Future Scenarios and Probabilities

1. Fire Family Plus.

2. Priority sub-regions within Geographic Area.

3. Fuel-type considerations.

4. Climate considerations.

5. Season Ending Event Probabilities.

G. Management Implications and Concerns

H. Summary and Recommendations

Seasonal Wildland Fire Assessment Format

- **Text:** Text should be in short, easy to understand, concise statements that refer to and elucidate the accompanying graphics. Remarks need to be "to the point." A specific forecast statement (i.e., "the bottom line") should be explicitly included in the executive summary and final summary and recommendations.

- **Length:** 10–15 pages (total including graphics). Text will be approximately 3–5 pages.

- **Graphics:** Include all graphics necessary to bolster your forecast, but not so many that the user will be confused or turned off. Additional materials can be folded into an appendix.

NOTE: We suggest that various sources of information be synthesized as much as possible. We advise that you distill the most important information down to just a few sentences that get at the bottom line. Each source does not need to be given exhaustive treatment. It is important to underscore cases where several tools provide either similar or conflicting perspectives. Reinforcement of similar perspectives provides confidence and conflicting perspectives highlight a lack of certainty in the long-term time frame.

Guidelines for Geographic Area Oral Presentations (Friday, January 21)

You will have 30 minutes to present the essentials of your geographic area seasonal outlook. In order to make your presentation most effective and useful to other participants, it is important to hit the highlights of your outlook, why you think things will turn out that way, what confidence you have in your outlook, and what elements you based your confidence on.

The basic message is: Keep It Simple!

1. Build toward your conclusion from initially simple arguments.

2. Use concisely worded "bullet" statements in your overhead or PowerPoint slides that you can elaborate on as you speak.

3. Please refer to your forecast confidence (or lack thereof).

4. Present a conclusion that summarizes only the main points in concisely worded statements.

Appendix B: Agenda

Wednesday, January 19, 2005

Morning

08:00–08:30	Introduction, logistics, and opening remarks – (*Gregg Garfin, CLIMAS; Heath Hockenberry, NICC*)
08:30–9:15	Last year's National Consensus Climate Forecast Verification and this year's forecast (*moderated by Tim Brown*)
9:15–10:15	Climate forecast panel discussion – IRI, CPC, and Regional Climate Center perspectives. Questions and comments from participants (*moderated by Tim Brown*).
10:30–12:00	Weather & fuels assessments/outlooks (*moderated by Heath Hockenberry*) Each GACC to discuss season, weather, and fire considerations specific to them. Fuels specialists invited to discuss current situation, emerging issues, and tools they use to gauge fire/fuels severity – 45 minutes for each GACC.

Afternoon

13:00–13:30	Discussion of seasonal assessment procedures and protocols (*moderated by Gregg Garfin and Heath Hockenberry*)
13:30–13:45	Breakout room/area assignments, Internet access, assistance, logistics – (*Gregg Garfin*)
13:45–17:00	Breakout sessions by Geographic area to begin preparing outlooks. Some climate forecasters will be available for consultation. An end of the day feedback session will be held as well.

Thursday, January 20, 2005

Morning

08:00–12:00	Breakout work sessions by geographic area to continue preparing outlooks.

Afternoon

13:00–13:30	Reconvene for group discussion of issues arising from work until now. Opportunity to discuss issues, needs, logistics, etc. for successful completion.
13:30–17:00	Breakout work sessions – Preparation of outlook, report writing, and presentation to group on Friday morning.

Friday, January 21, 2005

Morning

08:00–10:00	Presentations – Final outlook reports and presentations. Delivery of presentations to the group on your findings and conclusions.

Appendix C: Participant List

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