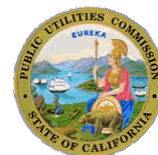


**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**



FILED

10/16/20
04:59 PM

Order Instituting Investigation on the
Commission's Own Motion on the Late 2019
Public Safety Power Shutoff Events.

Investigation 19-11-013
(Filed November 13, 2019)

**OPENING COMMENTS OF THE UTILITY REFORM NETWORK
ON SCOPING MEMO ISSUES**



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October 16, 2020

OPENING COMMENTS OF THE UTILITY REFORM NETWORK ON SCOPING MEMO ISSUES

I. INTRODUCTION

On November 13, 2019, the Commission issued Order Instituting Investigation 19-11-013 (“OII”) in order to “determine whether California’s investor-owned utilities prioritized safety and complied with the Commission’s regulations and requirements” for their Public Safety Power Shutoff (“PSPS”) events in 2019.¹

Pursuant to the Assigned Commissioner’s Scoping Memo and Ruling (“Scoping Memo”), issued on August 3, 2020, The Utility Reform Network (“TURN”) submits these opening comments on the issues identified in the Scoping Memo.

II. EVALUATION OF THE IMPLEMENTATION OF 2019 PSPS EVENTS

The instant OII was initiated to evaluate whether the IOUs’ actions “in October and November of 2019 regarding PSPS events complied with the then-existing PSPS Guidelines.”² On June 10, 2020, ALJ served a report by the Safety and Enforcement Division addressing the late 2019 Public Safety Power Shutoff Events (“SED Report”). A review of the SED Report reveals that it does not contain the necessary assessment as required by the Commission. The OII states that the SED assessment shall evaluate “the utilities’ actions prior to, during and after the PSPS events in late 2019, and utility *compliance* with the Commission’s existing de-energization regulations and

¹ I.19-11-013, p. 1.

² OII, pp. 2-3.

requirements.”³ Yet, the SED Report states that “this Report does not present findings of non-compliance with any statute, Commission order, or regulation” and that “[i]f SED were asked to undertake a compliance investigation, more extensive information collection and verification would be required.”⁴

Since the SED Report does not assess the compliance of the IOUs with the Commission’s regulations and requirements, TURN focuses its comments below on the compliance for only one requirement since TURN does not have the resources to address all the regulations and requirements. TURN addresses the IOUs’ compliance for whether and how the IOUs determined that the benefit of de-energization outweighed potential public safety risks. As noted by the SED Report, numerous parties have provided comments regarding this issue, and SED also found inadequacies for the IOUs.⁵ This is an important threshold question, and non-compliance with this requirement may result in more PSPS events than necessary, which would be harmful to the public.

As detailed below, it has become exceedingly clear that the IOUs *have not complied with this requirement*. In fact, the IOUs have not even attempted to comply with this requirement. Rather, as shown below, the IOUs have arbitrarily declared that the benefits of de-energization outweighed potential public safety risks without conducting any analysis.

³ OIL, p. 1. (emphasis added)

⁴ SED Report, p. 2.

⁵ SED Report, pp. 56-61.

A. PG&E Did Not Conduct a Cost Benefit Analysis and Does Not Have Any Supporting Documents or Workpapers

PG&E's non-compliance with this requirement has been well documented by other parties, including Joint Local Governments, AT&T, CforAT, CalCCA, SBUA, CSAC, and TURN.⁶ The SED Report also noted that PG&E only provided general information with minimal quantitative supporting data or rationale in its post-event reports. Furthermore, when asked by SED about compliance with this requirement, PG&E did not provide a direct response to this inquiry. Based on PG&E's response to TURN's data request (included in Attachment A), it has become exceedingly clear that PG&E did not conduct an analysis to determine that the benefit of de-energization outweighed potential public safety risks.

In its response, PG&E confirms that “[a]side from the information provided in the ESRB-8 reports, PG&E did not conduct any additional analyses and does not have any supporting documents or workpapers that demonstrate how PG&E determined that the benefit of de-energization outweighed potential public safety risks.”⁷ In order to determine that the benefit of de-energization outweighed potential public safety risks, PG&E would need to conduct an analysis that considers the number of people that would be impacted by the PSPS event, the potential duration of the PSPS event, the potential safety risks for the affected population (particularly the vulnerable), and other factors. PG&E admits that it did not conduct such analysis, and it does not have any supporting documents or workpapers to demonstrate how it determined the benefits of de-

⁶ SED Report, pp. 56-58.

⁷ DR TURN-PGE-01 Question 1 Supplemental 2.

energization outweighed the potential public safety risks.

This is a clear violation of D.19-05-042, and the Commission should take necessary enforcement action to ensure PG&E's compliance with the established requirements.

PG&E further argues that its compliance with this requirement would be better discussed in the next phase of R.18-12-005.⁸ PG&E's self-serving argument should be soundly rejected. First, determination of compliance with Commission requirements is not appropriate to be addressed in a Quasi-legislative phase of a rulemaking proceeding. Second, parties previously argued that PG&E's compliance with this requirement should be addressed in the Order to Show Cause phase of R.18-12-005, but the Commission determined that compliance of all requirements not identified in the Order to Show Cause Scoping Memo, issued on December 23, 2019, will be considered in the instant OII.⁹ Thus, it would be inappropriate for PG&E to argue now that compliance of this issue should be punted back to R.18-12-005.

B. SCE Readily Admits that It Does Not Perform Event-Specific Analyses of Whether the Benefits Outweigh the Costs of a PSPS Event

Similar to PG&E, SCE's non-compliance with this requirement has been well documented by other parties, including CforAT, SBUA, and Joint Local Governments.¹⁰ The SED Report also noted that SCE only provided general information with minimal quantitative supporting data or rationale in its post-event reports. Based on SCE's

⁸ PG&E Comments, p. 24.

⁹ R.18-12-005 Order to Show Cause Scoping Memo (December 23, 2019), p. 4.

¹⁰ SED Report, pp. 56-58.

response to TURN's data request (included in Attachment A), it has become exceedingly clear that SCE did not conduct a cost benefit analysis to determine that the benefit of de-energization outweighed potential public safety risks.

In its response, SCE confirms that "SCE has no additional responsive analyses, supporting documents, or workpapers related to the cost vs. benefit analysis that TURN is inquiring about."¹¹ Furthermore, SCE concedes that "SCE does not perform event-specific analyses of the benefit of a PSPS event compared to the cost to its customers due to power being shut off."¹² This is troubling because it directly contradicts a clear requirement in D.19-05-042 to make such a determination before conducting a PSPS event, and it also directly contradicts SCE's assertion in its comments that it "weighs the benefits and risks of de-energization, in close coordination with county emergency management offices, in deciding whether to deenergize a particular circuit or segment."¹³

Furthermore, SCE confirmed during a meet and confer that the number of customers affected by a PSPS (i.e. 50 vs 500 customers) does not affect its analysis for whether or not to conduct the event.¹⁴ This means that SCE is essentially assigning a cost of zero to all customers affected by the PSPS event, which is an outrageous assumption. Despite the well documented health and safety impact of a PSPS event on the public, SCE has chosen to assign a cost of zero to all customers affected by a PSPS event. This also explains why SCE has categorically determined that conditions that could result in a

¹¹ DR TURN-SCE-01, Question 1 Supplemental.

¹² DR TURN-SCE-01, Question 1 Supplemental.

¹³ SCE Comments, p. 60.

¹⁴ October 8 Meet and Confer. If SC disputes this fact, then TURN strongly believes that evidentiary hearings are necessary to resolve this factual dispute.

catastrophic wildfire would have significant impacts on public safety that outweigh the impacts of de-energization,¹⁵ regardless of the number of customers affected. This categorical determination is self-serving and not in the public's best interest because it serves to protect SCE's own interests by protecting itself from potential liabilities at the expense of customers by assuming that a de-energization event incurs no cost or safety impact to customers affected by the PSPS event.

This is a clear violation of D.19-05-042, and the Commission should take necessary enforcement action to ensure SCE's compliance with the established requirements.

C. SDG&E Did Not Conduct a Cost Benefit Analysis and Does Not Have Any Supporting Documents or Workpapers

SDG&E's non-compliance with this requirement has also been documented by other parties, including CforAT and SBUA.¹⁶ The SED Report also noted that SDG&E only provided general information with minimal quantitative supporting data or rationale in its post-event reports. Based on SDG&E's response to TURN's data request (included in Attachment A), it has become exceedingly clear that SDG&E did not conduct a cost benefit analysis to determine that the benefit of de-energization outweighed potential public safety risks.

In its response, SDG&E states that "SDG&E believes that loss of life and property that may (and have) occur when conditions that SDG&E described above

¹⁵ SCE Comments, p. 32.

¹⁶ SED Report, pp. 60-61.

materialize far outweigh the costs of a power outage.”¹⁷ Yet, despite the voluminous workpapers and supporting documentation provided by SDG&E describing the conditions leading up to the PSPS event, *SDG&E was not able to provide a single workpaper or supporting documentation that analyzed the costs of a power outage.*¹⁸ In other words, SDG&E has unilaterally and arbitrarily decided that the risk of a wildfire far outweighs the costs of a power outage without conducting or providing analysis or evidence to support this assertion. This is similar to SCE’s assignment of zero costs to customers experiencing a PSPS event. The reality is that despite the SDG&E’s lip service regarding how much it understands that a PSPS event may affect the public, SDG&E has predetermined, without any support, that the risk of wildfire always outweighs the costs of a PSPS event. While this may be true in terms of costs to SDG&E, this is surely not always true in terms of costs to the public, which experience health and safety consequences as a result of a PSPS event. This is a clear violation of D.19-05-042, and the Commission should take necessary enforcement action to ensure SDG&E’s compliance with the established requirements.

It is also worth noting that SDG&E absurdly objected to TURN’s data request, claiming that it is overly broad and unduly burdensome, vague, and seeks information that is not relevant to the proceeding.¹⁹ TURN’s data request asked for analyses, supporting documents, and workpapers that *relate to only one requirement from D.19-05-042* for two PSPS events conducted by SDG&E. Furthermore, TURN asked for

¹⁷ DR TURN-SDGE-01, Question 1.

¹⁸ DR TURN-SDGE-01, Question 1.

¹⁹ DR TURN-SDGE-01, Question 1, 2.

documentation relating to the very purpose of this proceeding (whether IOUs complied with PSPS requirements), and SDG&E ludicrously claimed that the data request is not relevant! Despite repeated requests from TURN, SDG&E refused to provide justification for its objections, and SDG&E also refused to withdraw its objections.²⁰ SDG&E's preposterous objections are telling, especially in a proceeding that is focused on determining the utilities' compliance – SDG&E seems determined to take procedural postures, however unreasonable, to thwart transparency and obstruct efforts to investigate its compliance. The Commission should not tolerate such behavior from SDG&E and should deny SDG&E's unsupported and absurd objections.

III. CORRECTIVE ACTION BASED ON 2019 PSPS EVENTS

As discussed above, the evidence is compelling that PG&E, SCE, and SDG&E did not comply with the Commission requirement to determine that the benefit of de-energization outweighed potential public safety risks. This has far-reaching and serious consequences. Since the IOUs are assigning zero costs to adverse impacts experienced by customers during a PSPS event, this likely led to more PSPS events being conducted than necessary. Furthermore, this treatment of assigning zero costs to customers also likely led to wider PSPS events than necessary, such as PG&E's decision to de-energize nearly one million customers, *twice*, in October of 2019.²¹ The Commission must enforce this crucial requirement for PSPS events. Without enforcement of this requirement, the Commission is essentially giving the IOUs a blank check to conduct as many and as wide of PSPS events as they deem necessary. Furthermore, without enforcement of this

²⁰ Multiple email exchanges between TURN and SDG&E on October 8, 2020.

²¹ 735,440 customers for October 9, 2019 event; 967,700 customers for October 26, 2019 event.

requirement, the Commission is not able to determine that the benefits to the public outweighed the costs to the public. In other words, the Commission is not able to determine that these PSPS events are in the public interest. This is a serious consequence that must be avoided.

To enforce this requirement, the Commission should look to Public Utilities Code Section 2107, which requires that the penalty for each violation or failure to comply with Commission requirements be no less than \$500 and no more than \$100,000 per offense.²² In Decision 98-12-075, the Commission established the criteria for considering reasonableness of penalties. The criteria include the severity of the offense, the conduct of the utility, the financial resources of the utility, public interest, and Commission precedent.

Undoubtedly, the IOUs will argue that if found to be in violation, each PSPS event should be counted as one offense. The Commission should reject such a nonsensical argument. To treat each PSPS event as one offense would be analogous to the IOUs' assignment of zero costs to customers affected by PSPS events, such that all PSPS events are equal, regardless of whether it affected 49 customers (such as SCE's 11/15 event) or 967,700 customers (such as PG&E's 10/26 event). To avoid this illogical result, the Commission should treat each customer affected by a PSPS event, for which the IOU has not adequately demonstrated that the benefits outweigh the public safety risks, as a separate offense. As noted above, each offense would be subject to a penalty of no less than \$500 and no more than \$100,000.

²² Public Utilities Code Section 2107.

VI. CONCLUSION

TURN appreciates this opportunity to provide these comments. TURN respectfully requests that the Commission adopt the aforementioned recommendations.

Date: October 16, 2020

Respectfully submitted,

By: _____/s/_____
David Cheng
Staff Attorney

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Attachment A

Data Requests Referenced in Comments

PACIFIC GAS AND ELECTRIC COMPANY
Public Safety Power Shutoff Event OII - 2019
Investigation 19-11-013
Data Response

PG&E Data Request No.:	TURN 001-Q01		
PG&E File Name:	PSPS Event OII-2019 DR TURN 001-Q01Supp02		
Request Date:	September 24, 2020	Requester DR No.:	001
Date Sent:	September 30, 2020 Supp01: October 2, 2020 Supp02: October 7, 2020	Requesting Party:	The Utility Reform Network
PG&E Witness:		Requester:	David Cheng

QUESTION 01

Please provide all analyses, supporting documents, and workpapers that demonstrate how PG&E determined that the benefit of de-energization outweighed potential public safety risks (as required per D.19-05-042) for the following events:

- a. October 5, 2019.
- b. October 9, 2019.
- c. October 23, 2019.
- d. October 26, 2019.
- e. October 29, 2019.

ANSWER 01 SUPPLEMENTAL 02

Per the meet and confer session between PG&E's counsel and TURN's counsel on October 1, as supplemented by an email between counsel on October 2, PG&E amends its previous response as follows:

PG&E considers many factors in weighing the risk of catastrophic wildfire against the impacts of de-energization. Specific details about the factors considered prior to each of the 2019 PSPS events are provided in the ESRB-8 report for each event. Aside from the information provided in the ESRB-8 reports, PG&E did not conduct any additional analyses and does not have any supporting documents or workpapers that demonstrate how PG&E determined that the benefit of de-energization outweighed potential public safety risks.

ANSWER 01 SUPPLEMENTAL 01

Per the meet and confer session between PG&E's counsel and TURN's counsel on October 1, PG&E amends its previous response as follows:

PG&E considers many factors in weighing the risk of catastrophic wildfire against the impacts of de-energization. Specific details about the factors considered prior to each of the 2019 PSPS events are provided in the ESRB-8 report for each event. Aside from

the information provided in the ESRB-8 reports, PG&E does not have any additional analyses, supporting documents, or workpapers that demonstrate how PG&E determined that the benefit of de-energization outweighed potential public safety risks.

ANSWER 01

Please see PG&E's responses to PSPS Event OII-2019_DR_CalAdvocates_007-Q05 and PSPS Event OII-2019_DR_CalAdvocates_007-Q01.

Southern California Edison
I.19-11-013 – OII on 2019 PSPS Events

DATA REQUEST SET T U R N - S C E - 0 0 1

To: TURN
Prepared by: June Bote
Job Title: Advisor
Received Date: 9/24/2020

Response Date: 10/8/2020

Question 001:

Page 32 of SCE's comments state, "...could result in a catastrophic wildfire if an ignition were to occur, which would have significant impacts on public safety that outweigh the impacts of de-energization." Please provide all analyses, supporting documents, and workpapers that support the above statement for the following events:

- a. October 9, 2019.
- b. October 16, 2019.
- c. October 24, 2019.
- d. October 28, 2019.
- e. October 30, 2019.

Response to Question 001:

For the 2019 events listed above, the decision to de-energize the circuit(s) was based on the expert judgement made by SCE's PSPS Incident Management Team Incident (IMT) Incident Commander when, after careful consideration of several qualitative and quantitative factors, it was determined that the public safety risk of a catastrophic wildfire occurring outweighed the impact of de-energization.

These factors included, but were not limited to, the following:

- Output from SCE's Fire Potential Index (FPI), which is an internal tool used to estimate wildfire potential based on actual weather and fuel conditions. Inputs to the FPI include wind speed, the dryness of the air near the ground, and vegetation moisture. The FPI is used in conjunction with wind thresholds to identify areas that are likely to have significant fire activity if an ignition were to occur, which could threaten communities.
- De-energization wind speed triggers, which are unique to each circuit and are dynamic based on evolving environmental and circuit-specific characteristics. Some factors that are taken into consideration when setting de-energization triggers include wind speed, FPI, ignition consequence modeling, circuit conditions, length of conductor, and other technical characteristics for the applicable circuit. The IMT takes characteristics such as a higher FPI, multiple historical outages, and outstanding maintenance items into account when determining if wind speed thresholds for recommending de-energization should be changed.

Southern California Edison
I.19-11-013 – OII on 2019 PSPS Events

DATA REQUEST SET TURN - SCE - 001 Q . 001 Supplemental

To: TURN

Prepared by: June Bote

Job Title: Reg Affairs & Compl, Advisor

Received Date: 10/8/2020

Response Date: 10/12/2020

Question 001 Supplemental:

Page 32 of SCE's comments state, "...could result in a catastrophic wildfire if an ignition were to occur, which would have significant impacts on public safety that outweigh the impacts of de-energization." Please provide all analyses, supporting documents, and workpapers that support the above statement for the following events:

- a. October 9, 2019.
- b. October 16, 2019.
- c. October 24, 2019.
- d. October 28, 2019.
- e. October 30, 2019.

Response to Question 001 Supplemental:

Pursuant to SCE's conversation with David Cheng on October 8, 2020, SCE hereby supplements its prior response to this question.

SCE has no additional responsive analyses, supporting documents, or workpapers related to the cost vs. benefit analysis that TURN is inquiring about. SCE does not perform event-specific analyses of the benefit of a PSPS event compared to the cost to its customers due to power being shut off.

Similarly, SCE does not perform separate risk assessments to establish de-energization thresholds during each PSPS event, but rather sets thresholds based on SCE's risk-informed assessment of the potential for a catastrophic wildfire should an ignition occur under the conditions presented. Under such conditions, the harm to life and property resulting from a catastrophic wildfire vastly outweighs the impacts of the de-energization necessary to eliminate the potential of ignition.

Additionally, SCE only uses de-energization when no other alternatives will mitigate this fire risk and SCE further minimizes the impact by limiting the de-energization to the smallest number of customers possible through segmentation of impacted circuits, where possible.

Southern California Edison
I.19-11-013 – OII on 2019 PSPS Events

DATA REQUEST SET T U R N - S C E - 0 0 1

To: TURN

Prepared by: June Bote

Job Title: Advisor

Received Date: 9/24/2020

Response Date: 10/8/2020

Question 002:

Please provide all analyses, supporting documents, and workpapers that demonstrate how SCE determined that the benefit of de-energization outweighed potential public safety risks (as required per D.19-05-042) for the following events:

- a. October 9, 2019.
- b. October 16, 2019.
- c. October 24, 2019.
- d. October 28, 2019.
- e. October 30, 2019.

For any analyses, supporting documents, and workpapers that are the same ones as those provided for Question 1 above, please state so.

Response to Question 002:

Please see response to question 1.

TURN DATA REQUEST: TURN-SDGE-01
I.19-11-013 PSPS OII
SDG&E RESPONSE

Date Received: September 24, 2020

Date Submitted: October 8, 2020

I. GENERAL OBJECTIONS

1. SDG&E objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.
2. SDG&E objects generally to each request that is overly broad and unduly burdensome. As part of this objection, SDG&E objects to discovery requests that seek “all documents” or “each and every document” and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, SDG&E will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.
3. SDG&E objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.
4. SDG&E objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires SDG&E to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel’s legal research, analyses or theories.
5. SDG&E objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence.
6. SDG&E objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.
7. SDG&E objects generally to each request to the extent that it would require SDG&E to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.
8. SDG&E objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of SDG&E.
9. SDG&E objects generally to each request to the extent that the request would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

TURN DATA REQUEST: TURN-SDGE-01

I.19-11-013 PSPS OII

SDG&E RESPONSE

Date Received: September 24, 2020

Date Submitted: October 8, 2020

10. SDG&E objects generally to each request that calls for information that contains trade secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. SDG&E objects to providing such information absent an appropriate protective order.

II. EXPRESS RESERVATIONS

1. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by SDG&E as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

2. SDG&E reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

3. SDG&E reserves the right to rely, at any time, upon subsequently discovered information.

4. These responses are made solely for the purpose of this proceeding and for no other purpose.

**TURN DATA REQUEST: TURN-SDGE-01
I.19-11-013 PSPS OII
SDG&E RESPONSE**

**Date Received: September 24, 2020
Date Submitted: October 8, 2020**

III. RESPONSES

QUESTION 1:

Page 27 of SDG&E's comments state, "When a combination of these factors are present, the risk of wildfire is a greater threat to public safety than shutting off the power itself." Please provide all analyses, supporting documents, and workpapers that support the above statement for the following events:

- a. October 24, 2019.
- b. October 29, 2019.

OBJECTION:

SDG&E objects to this request on the grounds set forth in General Objection Nos. 2, 3 and 5. Subject to the foregoing objections, SDG&E responds as follows.

RESPONSE 1:

The following is a detailed list of factors SDG&E utilizes to make de-energization decisions, and are referenced in the above statement.

SDG&E considers a wide variety of inputs to determine whether to de-energize portions of its system. SDG&E leverages a multitude of situational awareness data and input from its subject matter experts when considering the need for a Power Safety Power Shutoff (PSPS) event, though experience with the program has indicated that it is not appropriate to use a prescriptive technique to determine when to use PSPS as wildfire conditions are dynamic and not every situation is the same. In determining whether to employ a PSPS in a given area of its system, SDG&E considers a variety of factors such as:

- Weather Condition – Fire Potential Index (FPI), Red Flag Warnings and the Santa Ana Wildfire Threat Index (SAWTI)
- Vegetation conditions and Vegetation Risk Index
- Field Observations and flying/falling debris
- Information from first responders
- Meteorology, including 10 years of history, 99th and 95th percentile winds
- Expected duration of conditions
- Location of any existing fires
- Wildfire activity in other parts of the state affecting resource availability
- Information on temporary construction

SDG&E has not developed a specific PSPS algorithm that lists, quantifies and calculates the weight of each factor that is incorporated into a PSPS. SDG&E has developed and published

TURN DATA REQUEST: TURN-SDGE-01
I.19-11-013 PSPS OII
SDG&E RESPONSE

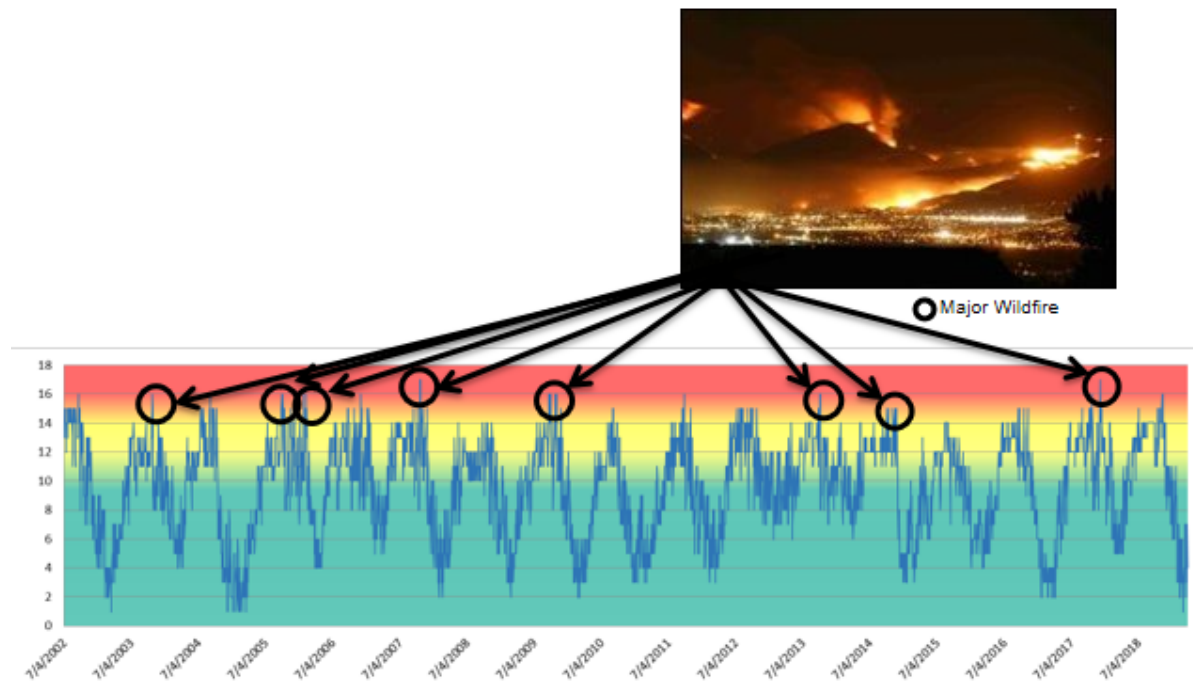
Date Received: September 24, 2020

Date Submitted: October 8, 2020

information regarding the factors and weights that go into the determination of the fire environment severity which is included in the FPI and SAWTI sections of SDG&E's 2020 Wildfire Mitigation Plan (WMP). The following is a description of the factors listed above, and how SDG&E utilizes this information to inform decisions on PSPS.

Weather Condition - Fire Potential Index: The FPI is created through three separate components. There is the green up which utilizes satellite data to determine the state of existing vegetation from very wet (lush) to very dry (cured). There is a fuels component that considers live fuel and dead fuel moisture across the service territory based on fire agency measurements and advanced analytics. And finally, there is a weather component that considers wind speeds and dewpoint depression, which is an indication of atmospheric dryness. The FPI is a forecasted value, based on measured data looking seven days in the future. However, even though it is a forecast, certain components like green-up and live fuel moisture do not materially change over a seven-day period, so that data very much grounds the FPI in reality. The specific wind speeds and dead fuel moisture are more volatile and can change significantly in seven days, which is why SDG&E prepares for PSPS using FPI, but does not implement PSPS on FPI alone, but on the real time conditions which will be described in greater detail below.

SDG&E has found that FPI has proven to be historically accurate in predicting the potential for large fires. The figure below depicts the historical FPI from 2002 to 2019.



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SDG&E RESPONSE

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As shown in the figure above, there are peaks which depict Extreme FPI days and the circles indicate that major wildfires ignited during those conditions. Thus, catastrophic wildfires are closely correlated with Extreme FPI days. In addition, when studying SDG&E's reliability and ignition data from 2015 – 2019, SDG&E's ignition percentage for faults increases significantly with higher FPI. The following chart shows that extreme FPIs are more than 6 times more likely that a fault will result in an ignition and over twice as likely when compared to elevated conditions. Note that these are results that have been mitigated through the historical use of PSPS and would likely be even higher had SDG&E not executed PSPS during extreme FPI from 2015 – 2019.

5-year average from 2015-2019			
FPI	Faults	Ignitions	Ignition %
Normal	972	11	1.1%
Elevated	299.6	9.6	3.2%
Extreme	20.75	1.5	7.2%

Weather Condition - Red Flag Warnings: SDG&E also utilizes the National Weather Service's declaration of Red Flag Warnings (RFW). Red Flag Warnings use similar weather data as the FPI incorporating the forecast for low humidity and high winds to make the declaration. In 2019, SDG&E forecasted an extreme FPI on nine of 365 days; The National Weather Service issued a Red Flag Warning on eight of those days, demonstrating that the two are correlated.

Vegetation Conditions and Vegetation Risk Index: The vegetation risk index (VRI) was developed internally using information from SDG&E's vegetation management database and SDG&E's reliability database. The VRI considers the species of trees, growth rates of trees, quantities and heights of trees, and vegetation-initiated outage and ignition history in proximity to electrical circuits. All of this data is measured with the exception of growth rate, which is calculated based on the measured growth and the time between the last trim and the current inspection. Vegetation risk is broken down into high, medium, and low. The role it has in general as far as PSPS criteria is concerned is that a circuit with a high VRI may inform a more conservative wind speed shutoff decision in an extremely high-risk event. For example, on an Extreme FPI day where a RFW was declared, if the real-time wind speeds were exceeding their 95th percentile winds for a given circuit segment on the associated weather station, subject matter experts confirmed that winds were increasing and forecast to persist at high levels, and the VRI was considered high, the decision could be made to de-energize, though there are additional factors that are taken into consideration, such as those listed later. Whereas, in the same situation described above, though the VRI had been low, the decision may have been to wait until the 99th percentile wind was exceeded. Again, the general logic here is that vegetation gets accustomed to experiencing a certain amount of wind, when that wind begins to exceed the levels its accustomed to experiencing (95th and 99th percentile winds for that area), the risk of a vegetation contact is increased. Thus, as wind speeds increase, the risk of vegetation contacts

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increases, that is why in an area with high vegetation risk already, it is prudent to be more conservative with wind speed.

Field Observations and Flying/Falling Debris: When SDG&E forecasts an Extreme FPI and a Red Flag Warning is declared, SDG&E activates its PSPS protocols and prepares for a PSPS should real time conditions meet or exceed the forecasted values. As part of the preparation, qualified electrical workers are sent to various locations across the territory based on where weather forecasts were expected to be the most extreme. These qualified electrical workers serve as field observers and their responsibility is to report back in real time what they observe in real time. While SDG&E has weather stations in the areas that are measuring the actual wind, they are at a fixed location. The field observers can move around the area and regardless of measured wind, can see the risk in the environment. Some things they look out for are whether there are tree branches and unsecured customer items (tarps, umbrellas) blowing around in the area, or whether SDG&E's conductors are holding still, swaying, or galloping in the wind. Depending on the situation, a field observer may report on an hourly basis, or may be asked to report on a far more frequent basis. They always have the ability to radio in and declare a situation is unsafe based on their observations. Depending on their reports, SDG&E may make the decision to PSPS in a more conservative way or less conservative way depending on the field observer reports. These reports are not measurements, but they provide strong qualitative situational awareness that combines with other quantitative information sources for improved overall decision making.

Information from First Responders: During Extreme FPI days, in preparation of PSPS events, many of the first responder agencies including police and fire are active as part of the event. In many of these events, 2019 included, fires began in SDG&E's service territory that were not started by the utility and CAL FIRE may make a request to de-energize a line so they can more safely suppress a fire. Other information they may provide could be that wind speeds are too high to utilize helicopters to combat fires should one occur. This type of warning would lead SDG&E to make more conservative PSPS decisions in regards to actual local wind speeds, understanding that if a fire were to occur, some of the more impactful fire suppression resources would be unavailable, increasing the chance that a fire could become catastrophic.

Meteorology including 10-year History, 95th and 99th Percentile Winds: SDG&E's weather data plays a major role in PSPS decision making. SDG&E now has over 190 unique weather stations in various parts of the service territory that are tied to certain circuits or circuit segments. There are four components of the wind data that are used in this process. The first is 95th and 99th percentile wind gust, these are calculated values based on a statistical analysis of a 10-year history of 10-minute wind reads for each of the 190 weather stations. The 99th percentile wind is simply the wind speed that represents the cutoff between the top 1% of wind speeds and the bottom 99th percent of wind speeds based on all data points. To further illustrate the amount of data SDG&E relies on, 10 years of data for one weather station equates to 525,600 total data points (e.g., Total data points = (10 years * 365 days/year * 24 hours/day * 60 minutes/hour) / 10 minutes reads = 525,600 wind speed measurements for a particular weather station). SDG&E then sorts the data from highest wind speed recorded to lowest. The data point 5,256 down from

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the highest ever recorded wind speed would represent the 99th percentile wind or the highest 1% of all wind recorded within the 10-year period. This same concept is applied for the 95th percentile wind, except now SDG&E would go all the way down to sorted data point 26,280 representing the top 5% of all wind speeds recorded within the 10-year period. The logic behind using these speeds as thresholds is that even though for a given weather station, the 99th percentile wind may only be 40mph, which is within the design criteria of most electric lines, the fact that the environment rarely sees that wind increases the chances of foreign object in line contacts, because the vegetation and other environmental factors are not used to seeing that relative level of wind speed, which increases the risk.

The next data point is the wind forecast for an event. Again, for this to even matter, it must coincide with an extreme FPI day. SDG&E have had many days with wind that was forecasted to exceed 99th percentile winds, but the FPI was normal due to high moisture levels. Under those conditions, PSPS protocols are not initiated. But if FPI is forecasted to be extreme, and weather stations are forecasted to exceed their 95th and/or 99th percentile levels, the PSPS protocols are initiated. The forecast by weather station of areas that will exceed these wind speeds creates a circuit watch list for the event, informs which customers and community partners must be notified, and informs the additional inspections of the circuits segments forecasted to be impacted to ensure they are in good condition before the event begins.

The final piece of wind data is the actual 10 minute (and in some cases 30 second reads) that are being recorded real-time during the event. SDG&E understands that while its weather forecasts are typically very good, when it is forecasting at very granular levels (an individual forecast for 190 weather stations) it is possible to have two kinds of error. The first and most common is that the wind speeds do not actually meet the forecasted values, or they never reach speeds that exceed their 99th and/or 95th percentile wind speeds. In most of these cases, the circuit segments associated with this wind speed would not be de-energized. Another type of error that can occur that is less common is that wind exceeds the forecast in a way where circuits not on the original forecasted watch list exceed their 99th and or 95th percentile winds, potentially leading to a shutoff. The takeaway here is that even though SDG&E prepares forecasts to be as prepared as possible for a PSPS event, it makes its ultimate decisions based off all the real time conditions described in bullet points above, including the real time recorded wind speed of its weather stations.

Expected Duration of Conditions: The length of the forecasted high-risk conditions also has a role on the PSPS decision making. This is a forecasted value based on meteorology measurements and models. If the event is forecasted to be a short duration, maybe exceed the 99th percentile winds for a short period of time, and there are no active fires, and wind speeds are not grounding CAL FIRE helicopters, a decision may be made to continue to monitor versus PSPS. However, the event is expected to last multiple days, there is little value in waiting it out because the risk exposure is prolonged. In these cases, SDG&E tends to make more conservative PSPS decisions in alignment with the 99th percentile winds.

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Location of Existing Fires: Location of existing fires is communicated and tracked through SDG&E's relationships with CAL FIRE and other first responder agencies. Active fires can influence PSPS decisions in multiple ways. One way is it can pull resources from future fires, which causes SDG&E to take a more conservative approach to PSPS. Another impact active fires may have is the de-energization of circuits for safety that are in proximity of the fire so that first responders can safely suppress the active fire.

Wildfire Activity Across the State: This is another data point that is communicated through emergency response partners. The issue here is that fires in other parts of the state could impact response resources in San Diego if they are being diverted up north. If resources become limited in San Diego due to response efforts across the state, SDG&E responds by being more conservative with PSPS decisions.

Information on Temporary Construction: SDG&E continues to harden the highest risk areas of its electric system. This does involve replacing existing lines with new construction, which requires temporary configurations to keep customers energized while the new lines are being built and the old lines are being removed. Temporary construction can include lines being left in rollers in preparation for pulling new conductor, or temporary "shoe flies" that use temporary structures to reroute power around the construction area. SDG&E documents these areas of temporary construction and de-rates their wind speeds thresholds. Sometimes this de-rated wind speed threshold is higher than the 99th percentile wind and will not be a deciding factor in PSPS, and sometimes its lower and it will be a deciding factor, along with the other circumstances listed in the bulleted items above.

Those are the factors that SDG&E considers when making PSPS decisions. To understand that the potential for a PSPS event is coming, an FPI forecast is created and is updated twice daily. SDG&E has attached the FPI conditions reported on 10/24 and 10/29 to demonstrate that the risk met the extreme criteria on those specific days. SDG&E is also attaching the circuit forecasts which allow SDG&E how to plan customer notifications at the 72-hour mark. It is the combination of extreme FPI and high wind in real time, along with the other factors listed above, which SDG&E uses to make the decision at a circuit segment by circuit segment level to de-energize. It is important to note that SDG&E does not make decisions based on a forecast. SDG&E warns customers of the possibility of PSPS based on forecasts, but it does not make the decision to actually PSPS until the risk conditions are met in real time. SDG&E's hardening of its transmission system, dense network of weather stations, and dense network of remote sectionalizing devices allow SDG&E to limit the use of PSPS only to the areas impacted by the real time risk. For example, if SDG&E were taking the approach of trying to shut down the HFTD to reduce risk, it would de-energize 184,000 customers. In SDG&E's forecast much of the HFTD has an extreme FPI. But SDG&E does not take that approach, SDG&E only de-energizes customers where extreme FPI occurs in combination with extreme wind (relative to the circuits historical wind profile). This has led to a maximum event size of 27,000 meters, which is less than 2% of SDG&E's meter base.

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As to SDG&E weighs these conditions, and the consequence of wildfire against the economic and safety impacts of PSPS, SDG&E believes that loss of life and property that may (and have) occur when conditions that SDG&E described above materialize far outweigh the costs of a power outage. As previously discussed, Extreme FPI and Red Flag Warning days are clear and proven warning conditions that severe fires could occur. There is unfortunately lots of evidence, including new devastating fires in 2020, that support the correlation between high FPI and catastrophic wildfires. High FPI combined with high winds make fires very difficult to suppress and control, creating a dangerous situation. This is especially true in San Diego where Santa Ana wind conditions will blow fires from their more rural eastern origin points to the more populated western areas. Fires in 2020 have shown SDG&E how high FPI combined with factors like other active fires in the state can even be devastating without extreme winds. Extreme FPI and lack of resources were the main contributing factors to recent fires, further supporting SDG&E's criteria that considers multiple factors when considering de-energization decisions.

SDG&E's largest 2019 PSPS event impacted 27,000 customers for an average of 25 hours. While there is some economic loss in a power outage, customers did not lose their lives or homes as a result of the power outages. As SDG&E was patrolling to return service to customers, 15 different damage locations were found that had to be repaired before returning service to customers. That damage reflects the potential for 15 devastating fires that could have ignited during extreme dry and windy conditions.

Nevertheless, SDG&E understands the hardships faced by customers when they are left without power, especially for the durations associated with PSPS events, whether the outage is unplanned or related to PSPS. SDG&E similarly acknowledges it may not be aware of all hardships faced by customers when they are without power. SDG&E has, however, mitigated many PSPS public safety concerns, especially to the most vulnerable, by strengthening partnerships with Community Based Organizations, improving service level agreements with resource agencies (2-1-1 San Diego and Orange County), investing in its infrastructure and expanding program offerings. Programs that include a variety of generator programs, one of which dedicated to medical baseline customers. Surveys from customers are ongoing and will continue to guide SDG&E improvements to mitigate deficiencies in all areas.

For documents supporting the discussion above, please refer to attachment "I.19-11-013 TURN-SDGE DR1 Attachments.zip."

**TURN DATA REQUEST: TURN-SDGE-01
I.19-11-013 PSPS OII
SDG&E RESPONSE**

Date Received: September 24, 2020

Date Submitted: October 8, 2020

QUESTION 2:

Please provide all analyses, supporting documents, and workpapers that demonstrate how SDG&E determined that the benefit of de-energization outweighed potential public safety risks (as required per D.19-05-042) for the following events:

- a. October 24, 2019.
- b. October 29, 2019.

For any analyses, supporting documents, and workpapers that are the same ones as those provided for Question 1 above, please state so.

OBJECTION:

SDG&E objects to this request on the grounds set forth in General Objection Nos. 2, 3 and 5. Subject to the foregoing objections, SDG&E responds as follows.

RESPONSE 2:

Please see the response to Question 1 above.

- Ongoing assessments from our in-house meteorologists using high resolution weather models.
- Data from SCE weather stations and publicly available weather stations.
- Deployment of on-the-ground observers in high fire risk areas to monitor live conditions in real time.
- Other operational considerations, such as the state of the potentially impacted circuits, flying debris, and downed wires.
- Any specific concerns received from state and local fire authorities, emergency management personnel, and law enforcement regarding public safety issues.
- Any expected impacts of turning off power to essential services such as public safety agencies, water pumps, and traffic controls.
- National Weather Service-issued watches and warnings for high fire risk areas in SCE's service area.

I.19-11-013 TURN-SDGE DR1 Attachments.zip

**Attachments to SDG&E's Response to TURN-SDGE-DR1 For
downloadable filed, please use the link referenced on page 14 of
Attachment A above.**

Email:
**“7-Day FPI Outlook Issued 10-24-19 RFW in Effect Through
1700 Fri”**

7-Day FPI Outlook Issued 10/24/19 ***RFW in Effect Through 1700 Fri***

Meteorology <Meteorology@semprautilities.com>

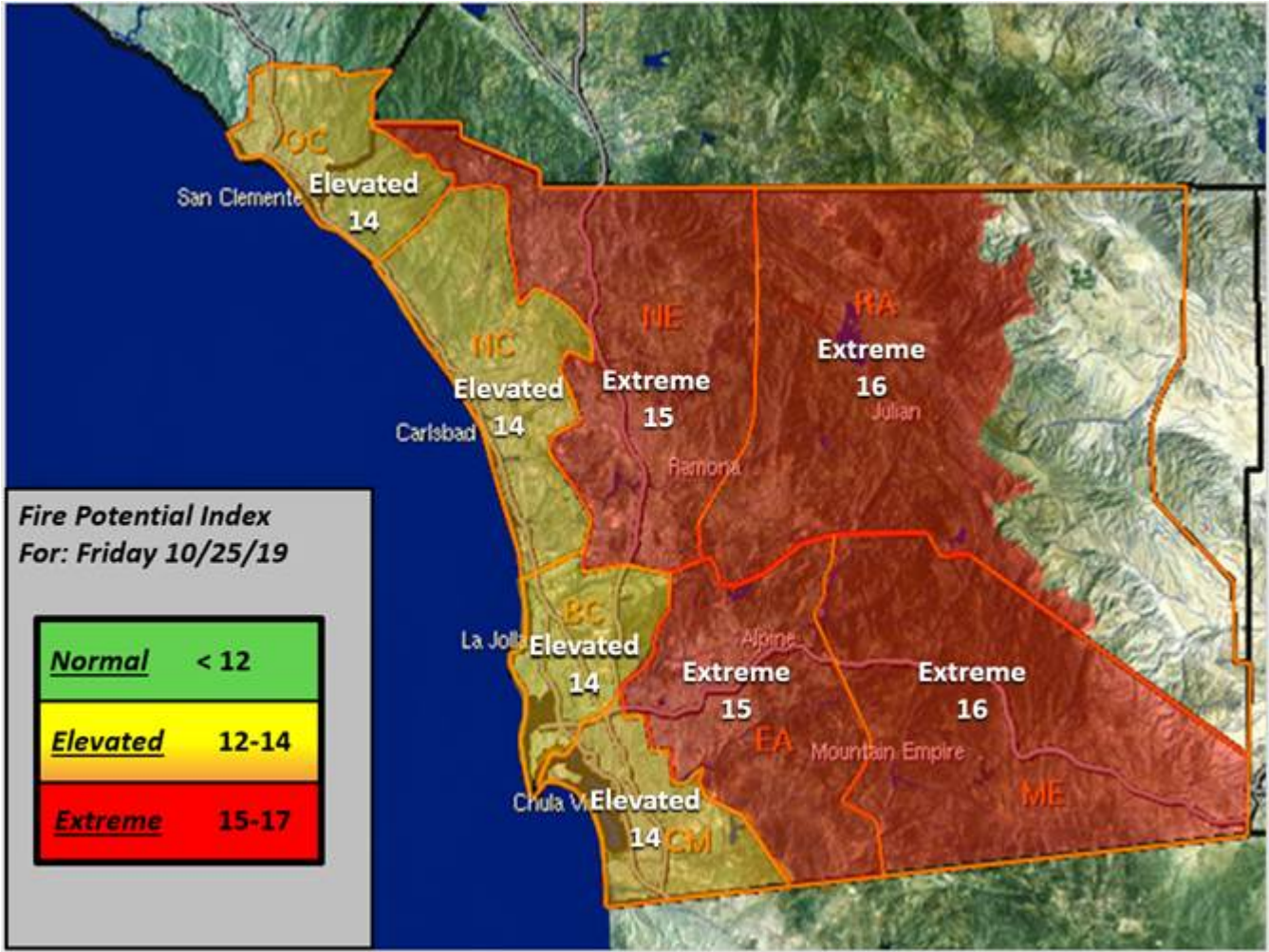
Thu 10/24/2019 12:31 PM

To: EDO - FPI <ENVOYCoreUsageAlert@socalgas.com>; CS Weather Distribution <CSWeatherDistribution@semprautilities.com>

Executive Summary:

- **A Red Flag Warning is in effect for Inland OC and the SD County Mountains and Valleys through 5 PM Fri**
 - Moderate to locally strong winds of 35-50 mph, isolated stronger, peaking in strength late tonight into Fri morning
 - Widespread temperatures in the upper 80s and 90s with 5-10% humidity
 - The FPI will be Extreme for all inland districts through Fri and for ME and RA on Sat
- Additional Santa Ana winds possible Sun/Mon... this event is currently trending weaker than the Thu/Fri wind event
- Remaining warm and dry but with light winds for the middle and end of next week

Fire Potential Index for Friday 10/25/19:



Seven Day FPI Outlook:

	Thu 10/24	Fri 10/25	Sat 10/26	Sun 10/27	Mon 10/28	Tue 10/29	Wed 10/30	Thu 10/31
ME	Extreme 16	Extreme 16	Extreme 15	Extreme 16	Extreme 16	Extreme 15	Elevated 14	Elevated 14
RA	Extreme 16	Extreme 16	Extreme 15	Extreme 16	Extreme 16	Extreme 15	Elevated 14	Elevated 14
EA	Extreme 15	Extreme 15	Elevated 14	Extreme 15	Extreme 15	Elevated 14	Elevated 13	Elevated 13
NE	Extreme 15	Extreme 15	Elevated 14	Extreme 15	Extreme 15	Elevated 14	Elevated 13	Elevated 13

OC	Elevated 14	Elevated 14	Elevated 13	Extreme 15	Extreme 15	Elevated 14	Elevated 13	Elevated 13
NC	Elevated 14	Elevated 14	Elevated 13	Elevated 14	Elevated 14	Elevated 13	Elevated 12	Elevated 12
BC	Elevated 14	Elevated 14	Elevated 13	Elevated 14	Elevated 14	Elevated 13	Elevated 12	Elevated 12
CM	Elevated 14	Elevated 14	Elevated 13	Elevated 14	Elevated 14	Elevated 13	Elevated 12	Elevated 12

Normal	Elevated	Extreme
< 12	12-14	15-17

FPI Discussion: Today through Saturday morning, a moderate to locally strong Santa Ana wind event will cause the Extreme FPI rating to return to all inland districts. Forecast models beyond Saturday are beginning to converge on a solution that would bring the potential for another Santa Ana wind event Sunday through Tuesday morning, though models are starting to trend slightly weaker. The Extreme FPI rating through Tuesday will continue to lean toward a worse case scenario until models more consistently depict the weaker solution. Meteorology will continue to monitor this event and provide updates as information becomes available. Details on our current Santa Ana are outlined below.

October 24-26 Santa Ana Winds:

- **Timing:** Santa Ana winds will continue this afternoon and begin ramping up again late tonight into tomorrow morning, peak in strength late tomorrow morning, and decrease tomorrow afternoon into the evening. Wind gusts early Saturday morning are expected to remain below 40 mph and should diminish by late morning.
- **Peak Winds:** Both today and tomorrow will have the potential for wind gusts of 35-50 mph across the backcountry with isolated stronger gusts possible in the usual wind-prone areas.
- **Temperatures:** Highs in the upper 80s and 90s for most locations west of the mountains. A Heat Advisory will be in effect until 5 pm Friday.
- **Humidity:** Widespread 5-10% with minimal overnight recovery.
- **Fire Potential:** An Extreme FPI is forecast for all inland districts today and tomorrow, and in ME & RA on Saturday. All other districts will be Elevated due to low humidity and very dry fuels with minimal fuel moisture recovery.
- **NWS Watches/Warnings:** A Red Flag Warning will remain in effect through 5 pm Friday for Inland Orange County and the San Diego County Valleys and Mountains. A High Wind Warning will be in effect from 8 pm this evening until 2 pm Friday for the SD County Valleys and Mountains for potentially damaging winds.
- **Santa Ana Wildfire Threat Index:** The SAWTI is projected to be Moderate both today and tomorrow, and Marginal for Sun/Mon, which may change as forecast models come into alignment.
- **Extended Outlook:** Warm and dry from the middle of next week through the end of the week.



Santa Ana Wildfire Threat Index for San Diego County:

Thu 10/24	Fri 10/25	Sat 10/26	Sun 10/27	Mon 10/28	Tue 10/29
Moderate	Moderate	No Rating	Marginal	Marginal	No Rating

No-Rating	Marginal	Moderate	High	Extreme
Santa Ana winds are not expected or will not contribute to significant fire activity.	Upon ignition, fires <i>may</i> grow rapidly.	Upon ignition, fires <i>will</i> grow rapidly and <i>will</i> be difficult to control.	Upon ignition, fires will grow <i>very</i> rapidly and will be <i>very</i> difficult to control.	Upon ignition, fires will have extreme growth and will be uncontrollable.

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Carrie Bowers
Fire Science Meteorologist
Fire Science & Climate Adaptation
San Diego Gas & Electric
(619) 889-4523

Email:

**“7-Day FPI Outlook Issued 10-29-19 RFW in Effect 11pm
tonight- 6pm Thurs”**

7-Day FPI Outlook Issued 10/29/19 ***RFW in Effect 11pm tonight- 6pm Thurs***

Meteorology <Meteorology@semprautilities.com>

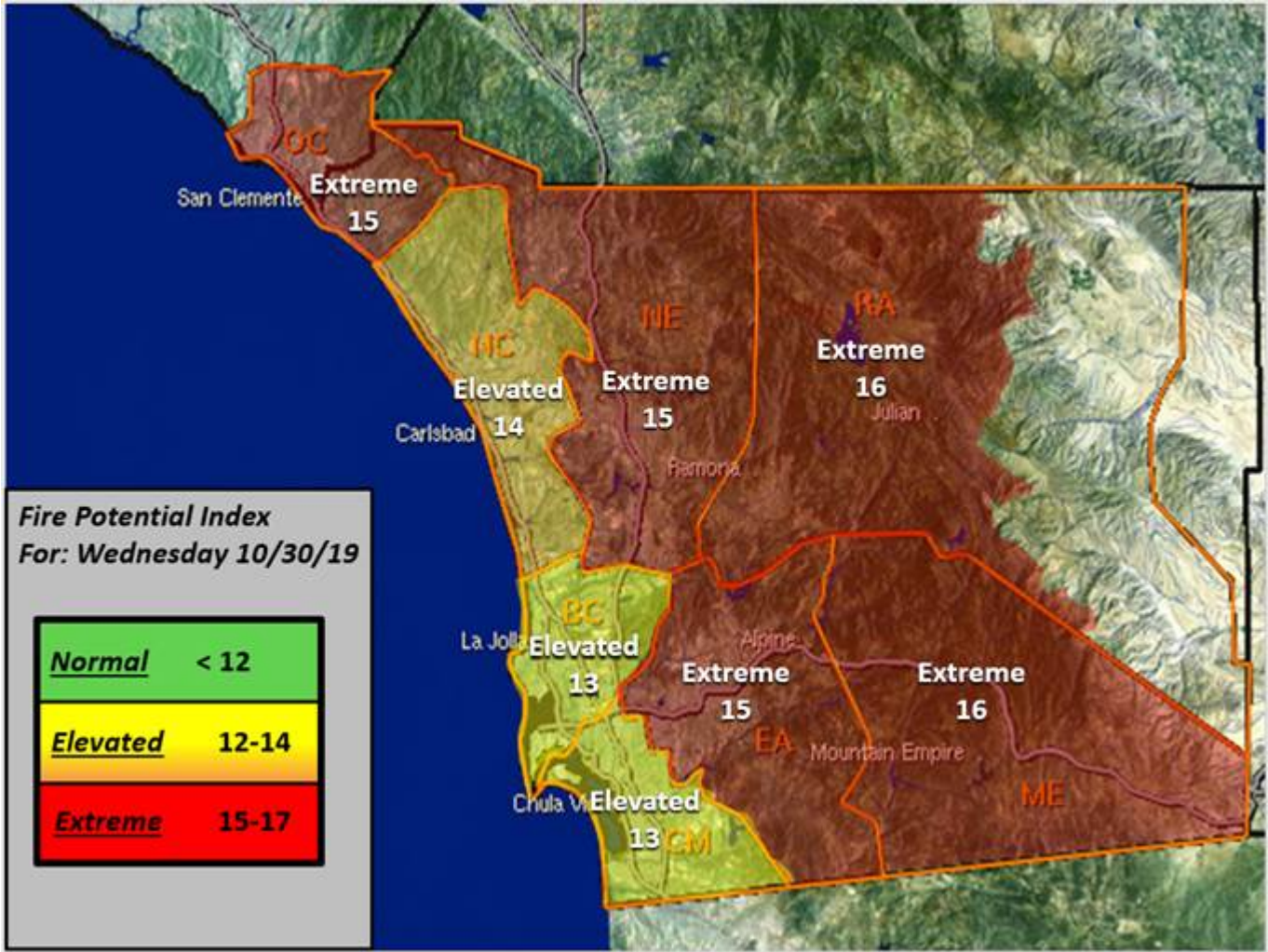
Tue 10/29/2019 12:30 PM

To: EDO - FPI <ENVOYCoreUsageAlert@socalgas.com>; CS Weather Distribution <CSWeatherDistribution@semprautilities.com>

Executive Summary:

- Fair weather today until the arrival of Santa Ana winds late tonight
- **Red Flag Warning in effect for Inland OC and SD County Mountains and Valleys 11 pm tonight – 6 pm Thurs**
- Extreme FPI for all inland districts Wed/Thu and OC on Wed
- Strong Santa Ana event Wed/Thu, dissipating Fri morning
- Mild weather returns Friday afternoon through next week
- View a short weather briefing video [HERE](#)

Fire Potential Index for Wednesday 10/30/19:



Seven Day FPI Outlook:

	Tue 10/29	Wed 10/30	Thu 10/31	Fri 11/01	Sat 11/02	Sun 11/03	Mon 11/04	Tue 11/05
ME	Elevated 14	Extreme 16	Extreme 16	Elevated 14	Elevated 14	Elevated 14	Elevated 14	Elevated 14
RA	Elevated 14	Extreme 16	Extreme 16	Elevated 14	Elevated 14	Elevated 14	Elevated 14	Elevated 14
EA	Elevated 12	Extreme 15	Extreme 15	Elevated 14	Elevated 14	Elevated 13	Elevated 13	Elevated 13
NE	Elevated 12	Extreme 15	Extreme 15	Elevated 14	Elevated 14	Elevated 13	Elevated 13	Elevated 13

OC	Normal 11	Extreme 15	Elevated 14	Elevated 14	Elevated 13	Normal 11	Normal 11	Normal 11
NC	Normal 11	Elevated 14	Elevated 14	Elevated 12	Elevated 12	Normal 11	Normal 11	Normal 11
BC	Normal 11	Elevated 13	Elevated 14	Elevated 12	Elevated 12	Normal 11	Normal 11	Normal 11
CM	Normal 11	Elevated 13	Elevated 14	Elevated 12	Elevated 12	Normal 11	Normal 11	Normal 11

Normal	Elevated	Extreme
< 12	12-14	15-17

FPI Discussion: The National Weather Service has issued a Red Flag Warning for Inland Orange County and the San Diego County Valleys and Mountains (Zones 554, 250, & 258) from 11 PM Tuesday (10/29) through 6 PM Thursday (10/31).

- **Timing:** A strong Santa Ana wind event is forecast to begin between 10 pm-midnight tonight
 - Wednesday morning: Widespread breezy peaking between 9 am to 3 pm, decreasing until the evening blip after sunset
 - Wednesday night: After sunset, windspeeds in the backcountry will ramp back up and remain locally strong through the overnight hours
 - Thursday: More isolated to backcountry areas and reaching a peak by noon. Winds will decrease through the afternoon and diminish in the overnight hours.
 - Friday: Light easterly winds may remain over backcountry areas early morning through the afternoon
- **Peak Winds:**
 - Wednesday: Backcountry gusts of 35-50 mph, isolated stronger in wind-prone locations. Coastal areas may see gusts of 20-35 mph, with exposed locations seeing slightly higher gusts.
 - Thursday: Backcountry gusts of 40-50 mph in the morning, isolated stronger in wind-prone locations.
 - Friday: Gusts of 20-30 mph in the windiest backcountry locations.
- **Temperatures:** Highs in the 70s to low 80s west of the mountains. Overnight lows in the mountains of 30-45 degrees.
- **Humidity:** Widespread 5-15% with minimal overnight recovery.
- **Fire Potential:** An Extreme FPI is forecast for all inland districts Wed/Thu and in OC on Wednesday. All other districts will be Elevated.
- **NWS Watches/Warnings:** Red Flag Warning and High Wind Watch from 11 pm tonight until Thursday 6 pm for SD County Mountains and Valleys and Inland Orange County.
- **Santa Ana Wildfire Threat Index:** The SAWTI is rated Moderate for Wednesday and Thursday. For more information, go to: <https://fsapps.nwcg.gov/psp/sawti>.
- **Extended Outlook:** Mild weather with slowly recovering humidities is expected Friday through next week.

Santa Ana Wildfire Threat Index for San Diego County:

Tue	Wed	Thu	Fri	Sat	Sun
------------	------------	------------	------------	------------	------------



10/29	10/26	10/27	10/28	10/29	10/30
No Rating	Moderate	Moderate	No Rating	No Rating	No Rating

No-Rating	Marginal	Moderate	High	Extreme
Santa Ana winds are not expected or will not contribute to significant fire activity.	Upon ignition, fires <i>may</i> grow rapidly.	Upon ignition, fires <i>will</i> grow rapidly and <i>will</i> be difficult to control.	Upon ignition, fires will grow <i>very</i> rapidly and will be <i>very</i> difficult to control.	Upon ignition, fires will have extreme growth and will be uncontrollable.

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Briefing Santa Ana October 28 Slides



Fire Danger



Santa Ana winds October 28-31, 2019



Weather Briefing

Alex Tardy- NWS San Diego

Issued October 28, 2019

Webinar #4



Building a Weather-Ready Nation



Highlights

Up Front

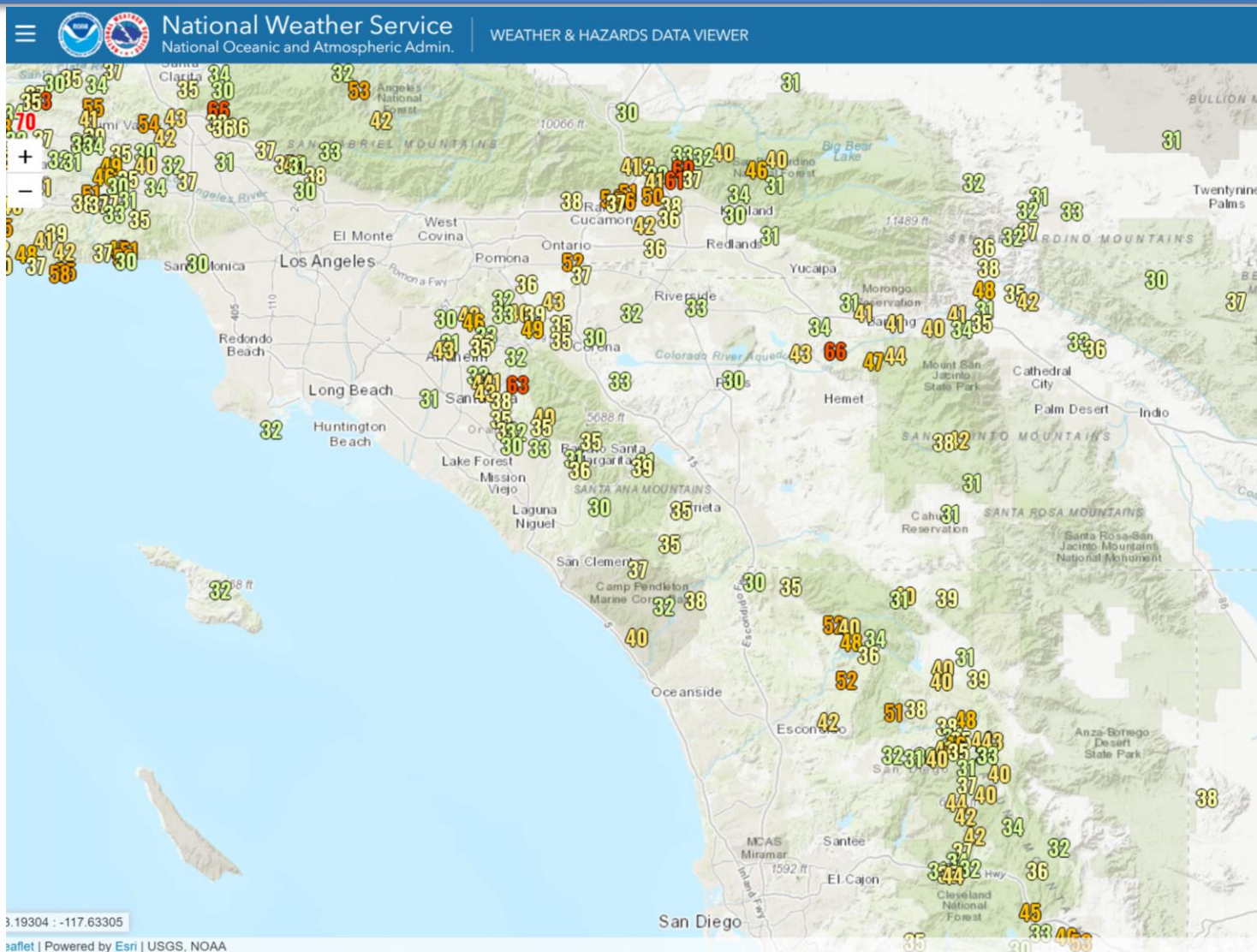


- ❑ **New Red Flag Warning – High Wind Watch/Warning**
- ❑ Santa Ana wind Tuesday night into Thursday (strongest of season some areas and other areas similar to October 24-25)
- ❑ **Very dry air** for Wednesday and Thursday
- ❑ **High fire danger**
- ❑ Cold at night for mountain valleys and wind sheltered areas
Thursday and Friday morning – **Freeze Watch**
- ❑ Light daily winds and warmer Friday into weekend
- ❑ Warm and dry conditions through early November





Peak Wind today (mph)



Building a Weather-Ready Nation



Q & A

Common questions



What is a Santa Ana wind?

Offshore wind (northeast to east direction) that brings windy conditions blowing from deserts to coast to southern California mountains and passes along with usually warm temperatures and dry air

What causes a Santa Ana wind?

Cold air over the Great Basin so it is most common in Fall and Winter, behind a storm system that places southern California on the dry and warm side. Southern California mountains enhance and magnify the wind flow from High to Low pressure (passes, gaps, mountain waves, canyons)

What is SAWTI?

Santa Ana Wildfire Threat Index issued by the US Forest Service Predictive Services unit which predicts large wildfire potential (linked to historical large wildfires) associated with predicted level of Santa Ana wind and fuel conditions

Which is worse Red Flag Warning or Watch?

Warning means conditions are imminent and dangerous to a large population or region. Watch means that there is a potential for Red Flag conditions. Red Flag includes high winds, dry air (low humidity) and dry fuel conditions (vegetation). **Elevated fire weather danger** would be conditions less than Red Flag. Red Flag warnings do not predict wildfires, only the conditions that can cause extreme fire behavior

Wind prone area are?

Canyons, passes, mountain gaps, highway passes, interstate passes, and locations “downwind” of the Santa Ana offshore flow. Includes I-15 Cajon Pass, I-10 San Geronio Pass, I-8 San Diego mountains pass, east of I-10 Coachella Valley, highway 91 pass and highway 78 corridor



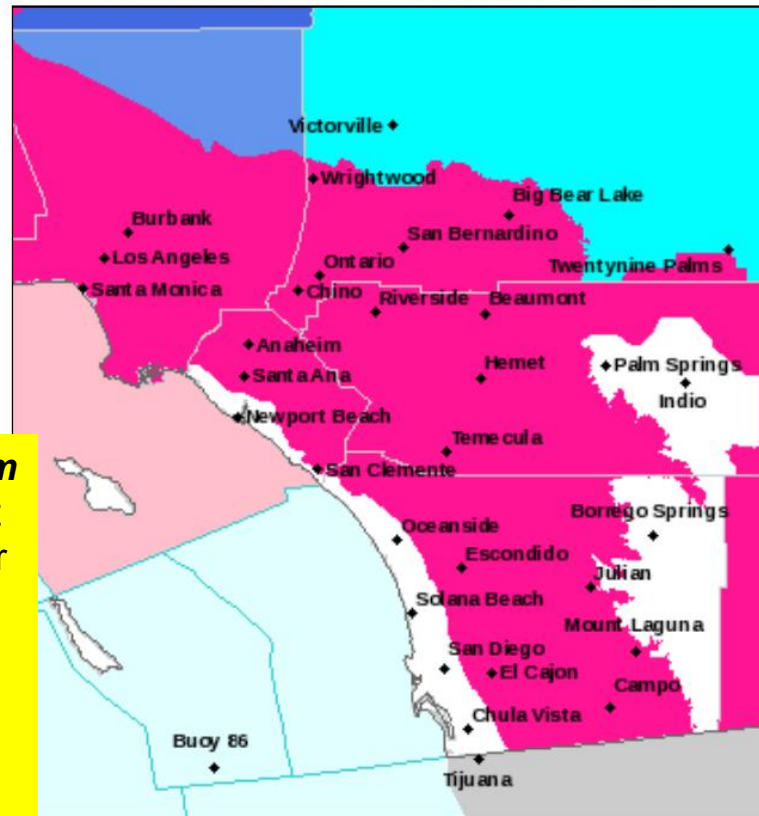


Hazards in Effect now

Weather.Gov



Click a location below for detailed forecast.



[Watches,](#)
[Warnings &](#)
[Advisories](#)



[Red Flag Warning](#)

[Wind Advisory](#)

[Frost Advisory](#)

[Gale Watch](#)

[High Wind Watch](#)

[Hard Freeze Watch](#)

[Freeze Watch](#)

[Marine Weather](#)
[Statement](#)

[Air Quality Alert](#)



Last Map Update: Mon, Oct. 28, 2019 at 2:41:23 pm PDT

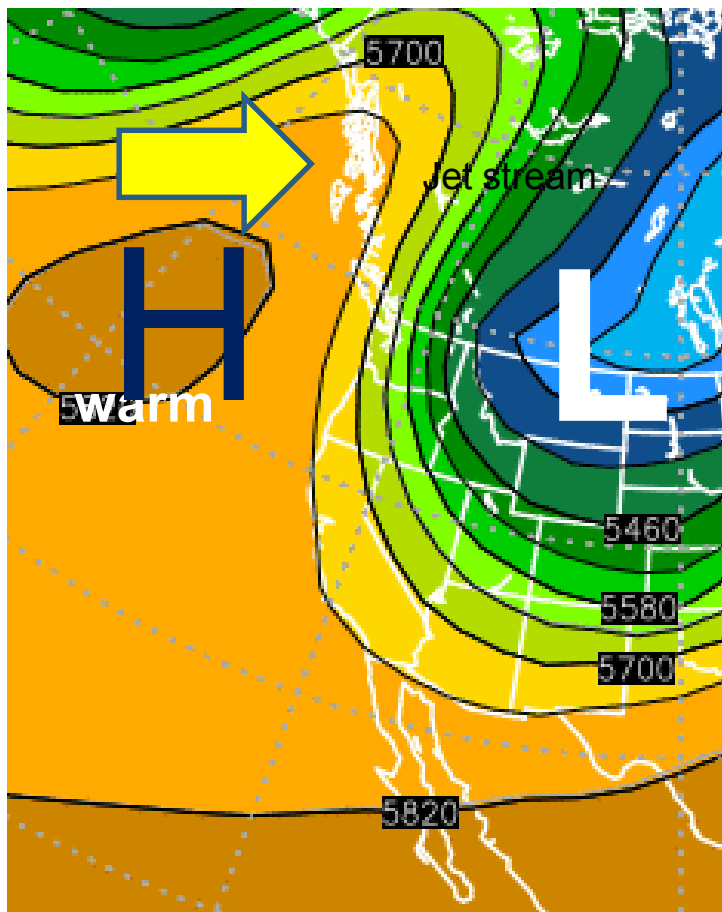


Building a Weather-Ready Nation

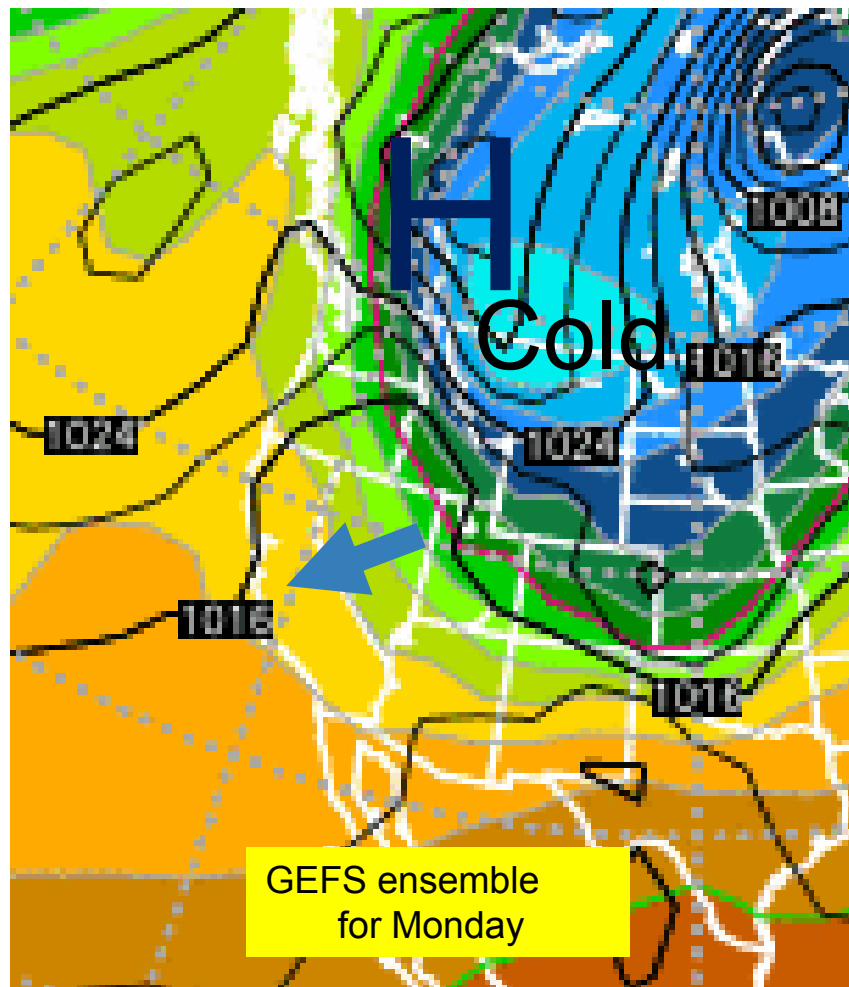
Santa Ana and more to come

Cold air (high pressure) behind a Great Basin storm

Today's weather pattern



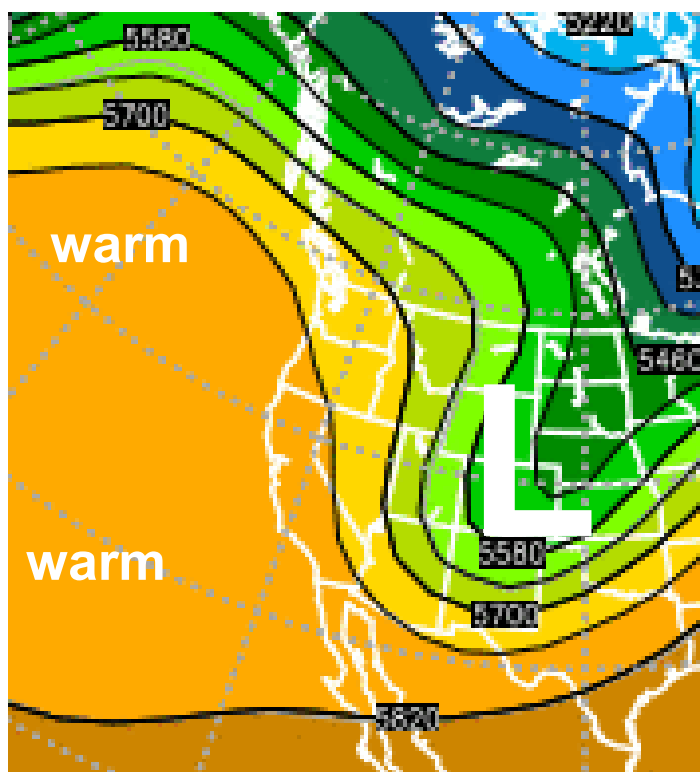
Wind blows dry air offshore



Repeat weather pattern as to Monday?

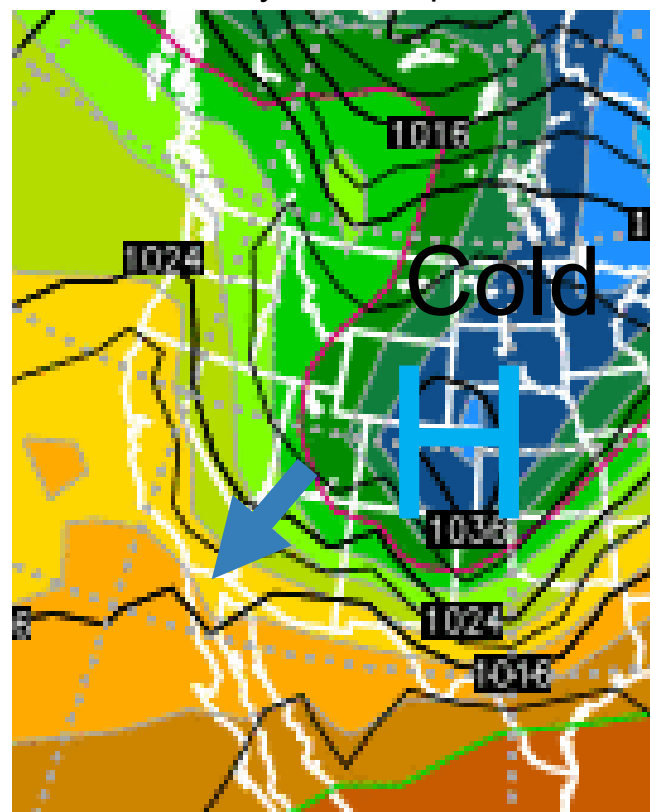
Cold air (high pressure) behind a Great Basin storm

Jet stream



Wind blows dry air offshore

Wednesday weather pattern

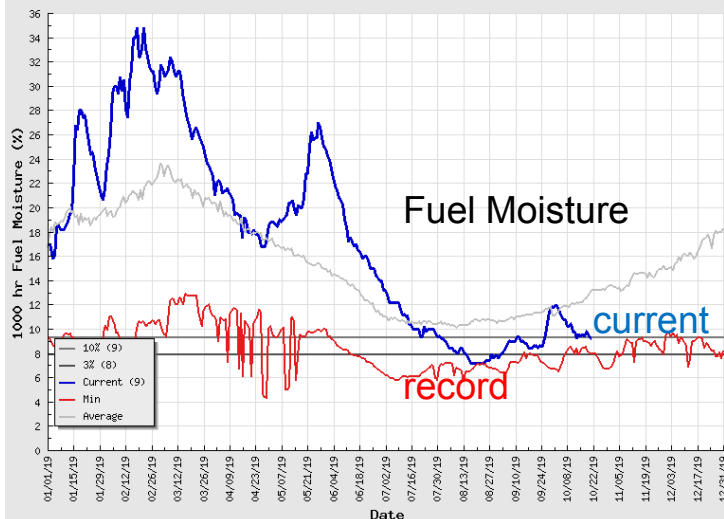


GEFS ensemble
for Wednesday

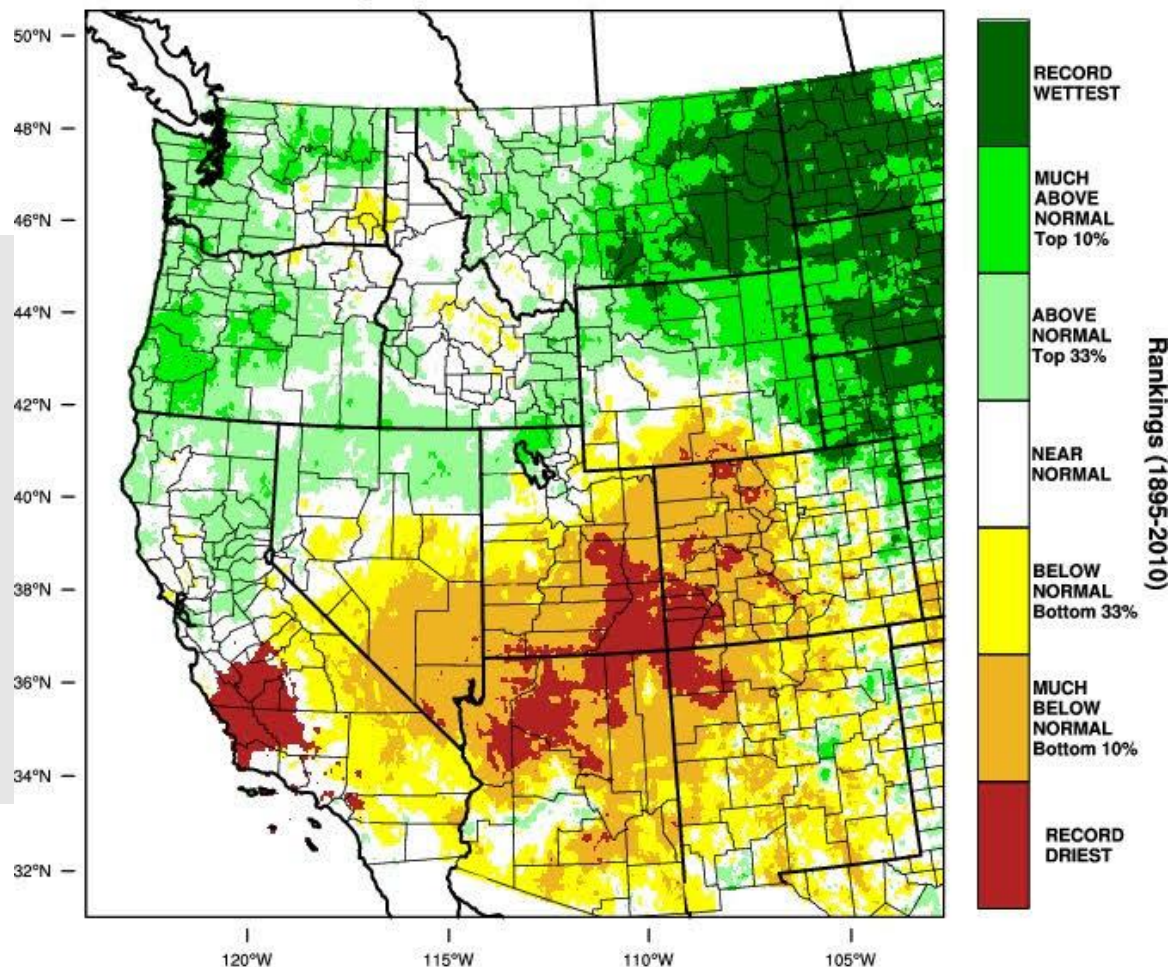
Summer Monsoon was dry

Drier than average fuel

SC11 - Southern Mountains
Valid Date: 21-Oct-2019



Western United States - Precipitation
July-September 2019 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 OCT 2019



Wind for Tuesday night into Thursday morning

Santa Ana (east to northeast) winds

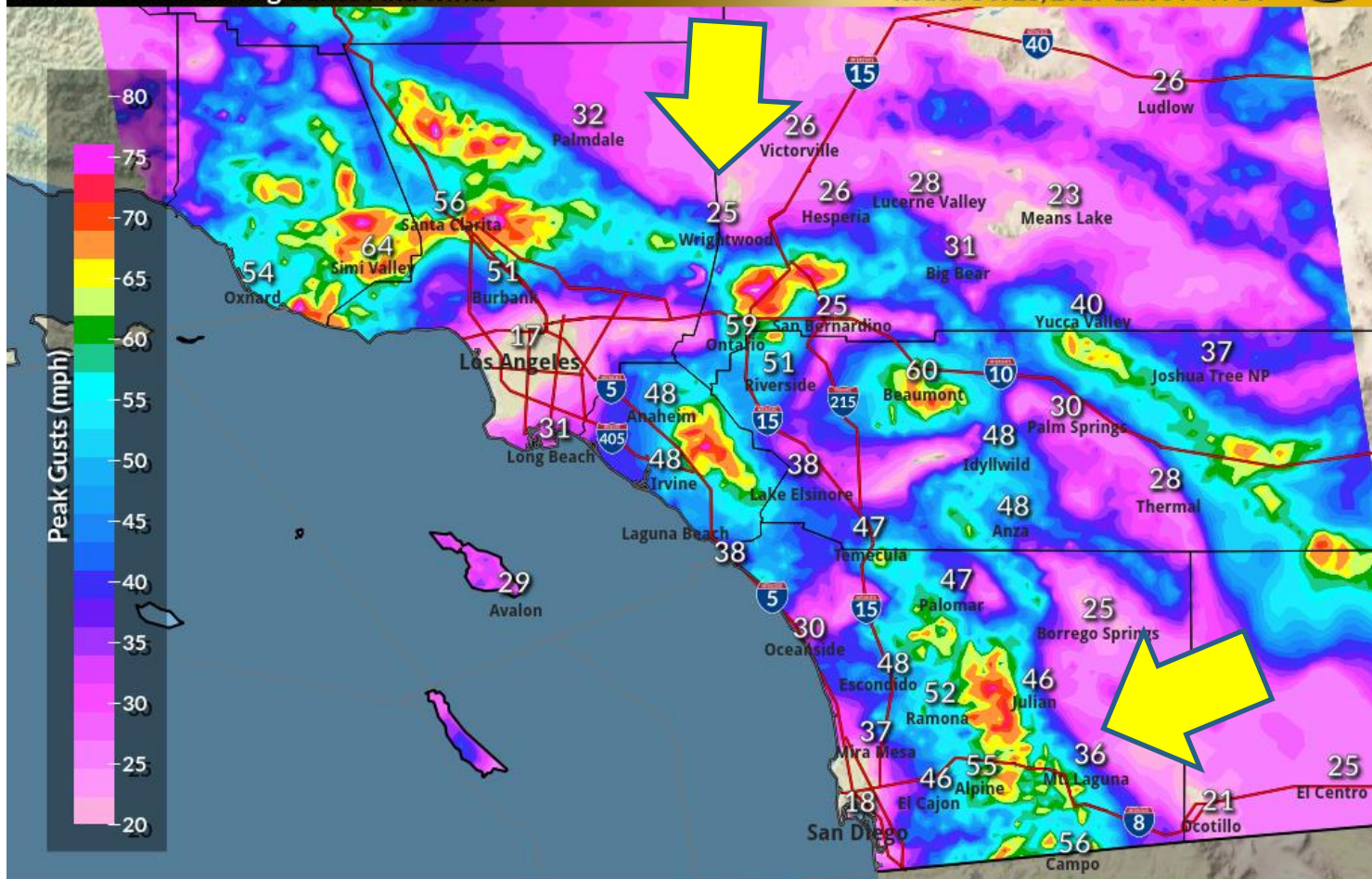


Peak Santa Ana wind Wednesday - Thursday

Weather Forecast Office
San Diego, CA

Moderate and Strong Santa Ana winds

Issued Oct 28, 2019 12:58 PM PDT



NWSSanDiego

weather.gov/sandiego



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Air becomes drier on Wednesday

Minimum humidity



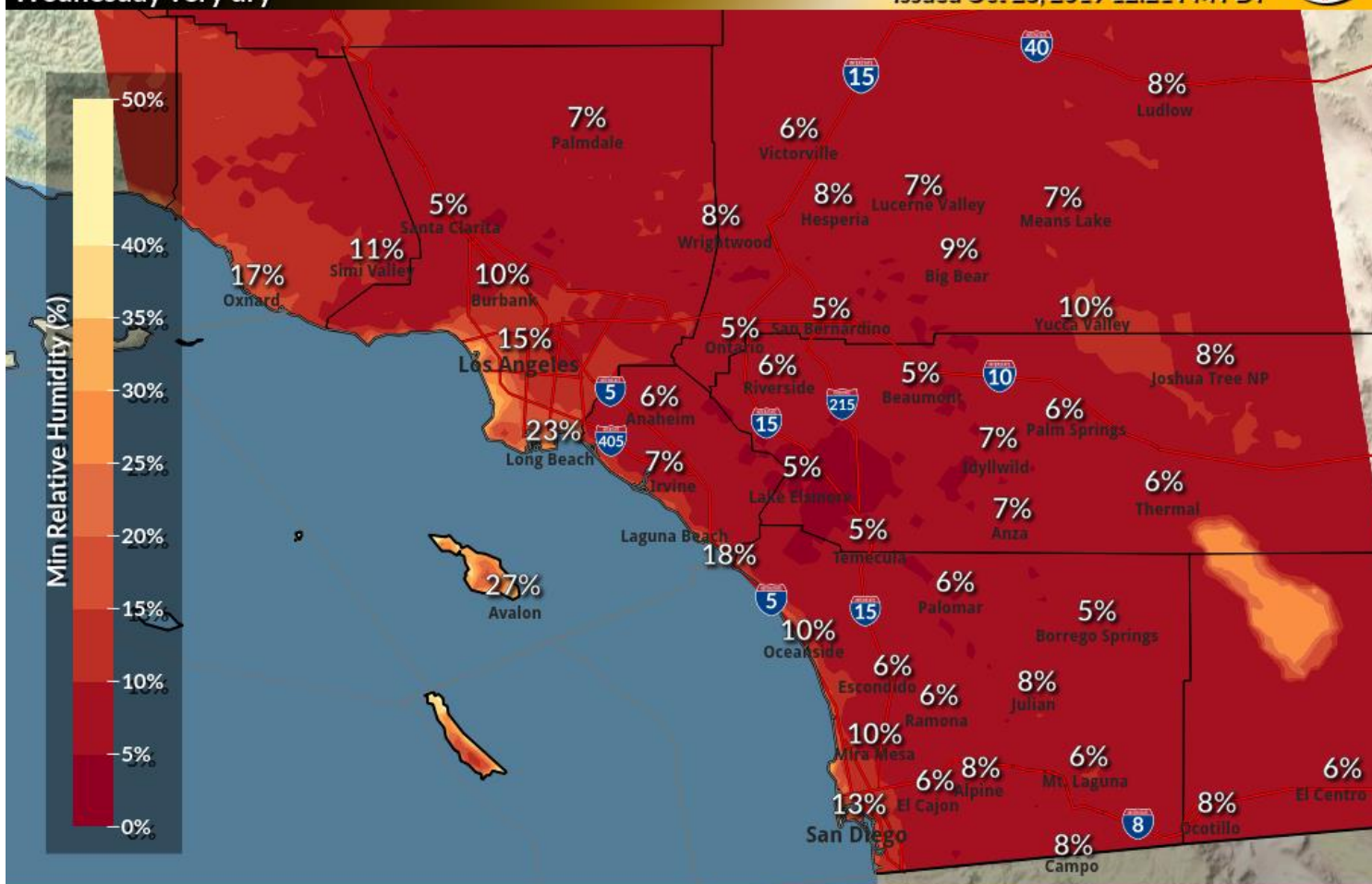
Minimum Humidity (after Santa Ana)

Weather Forecast Office

San Diego, CA

Wednesday very dry

Issued Oct 28, 2019 12:21 PM PDT



NWSSanDiego

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Very low humidity Thursday

Very dry air – poor recovery at night



Minimum Humidity (after Santa Ana)

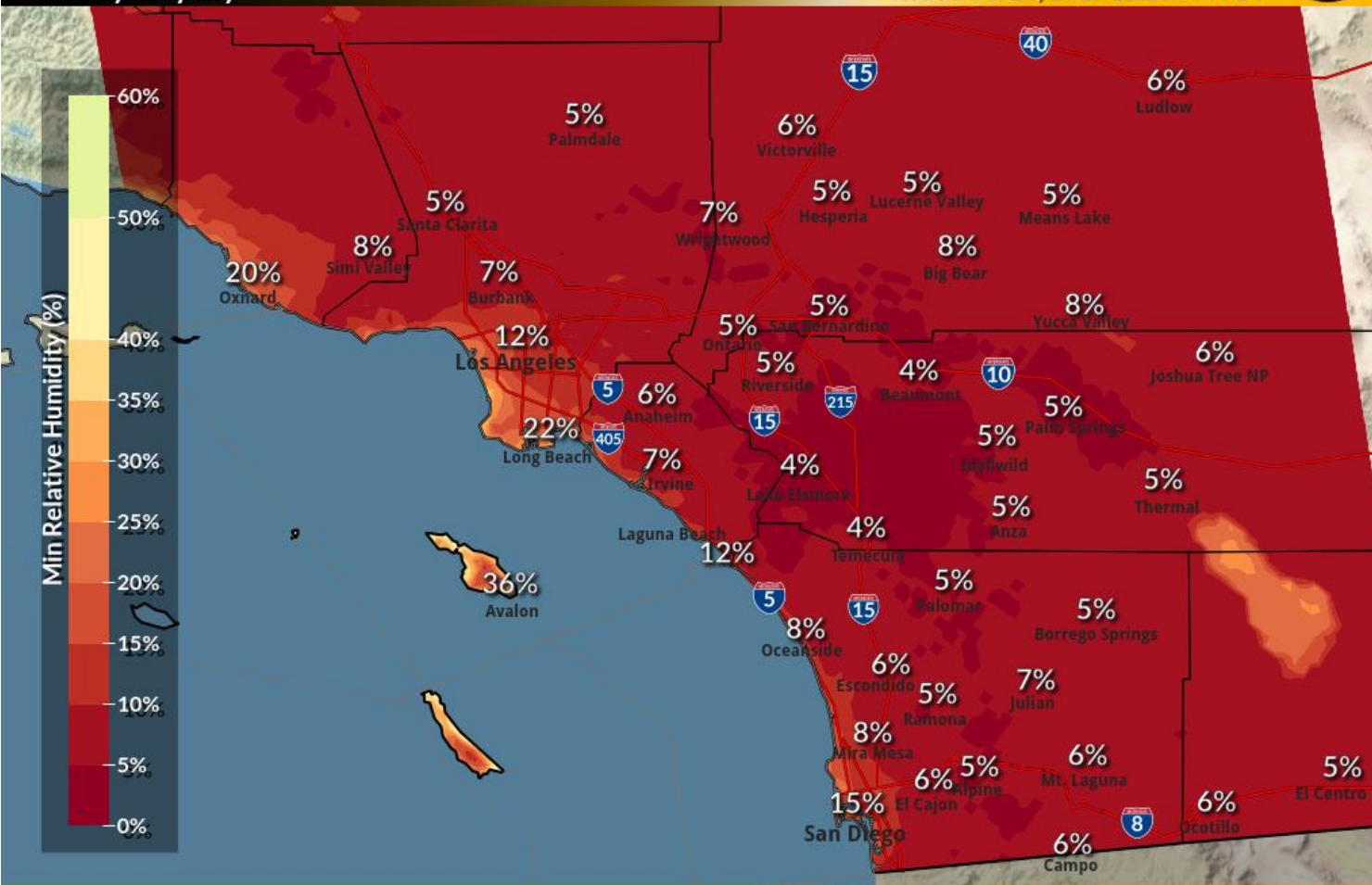
Weather Forecast Office

San Diego, CA

Issued Oct 28, 2019 12:23 PM PDT



Thursday very dry



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High Temperatures Thursday

Hottest coast due to Santa Ana wind

High temperatures on Thursday

Cool Santa Ana winds

Weather Forecast Office

San Diego, CA

Issued Oct 28, 2019 12:34 PM PDT



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Cool at night – dry air



Low temperatures Thursday/Friday morning

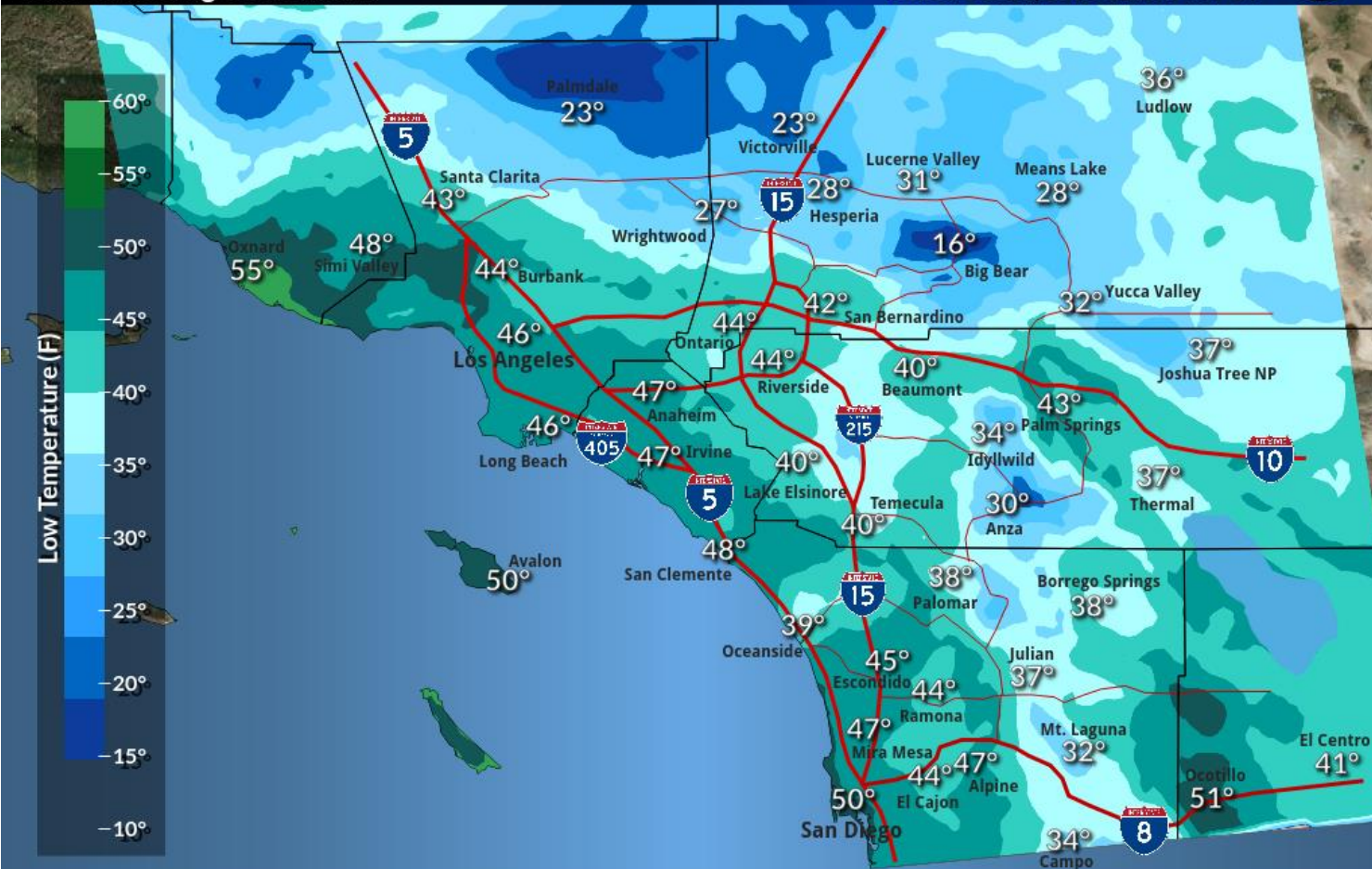
Low Temperatures Thursday AM

Coldest morning of the week.

Weather Forecast Office

San Diego, CA

Issued Oct 28, 2019 12:17 PM PDT



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Santa Ana wind conditions October 28-31, 2019



- ❑ Weakening cool Santa Ana winds today (Red Flag expires) – Tuesday is quiet
- ❑ **Widespread Santa Ana winds Tuesday night which continue into Thursday morning** - **Very dry air** (single digit humidity) despite cool air
- ❑ **Moderate to Strong Santa Ana wind overall** – localized strong wind gusts 80 mph in most wind prone areas (canyons and downslope) – strongest of fall 2019
 - **Into Thursday morning: Wind gusts 35 to 50 mph for most areas of Santa Ana, Inland Empire, inland valley and San Bernardino mountains and in San Diego foothills land mountains – strongest gusts 70-80 mph for most wind prone. Many areas at least wind gusts 20 to 40 mph**
 - **Wind gusts to 30 mph on the coast for wind prone areas**
 - **Poor humidity recovery Wednesday night (dry and mild on mountain slopes)**
- ❑ **Cold air** – wind sheltered areas cold at night – especially Thursday and Friday morning
- ❑ **Remaining dry and warmer Friday and weekend with much less wind**
- ❑ **Long range outlook does not see Santa Ana wind at this time but dry and mild**





Get Updates!



Fire Weather Watch – Potential for Red Flag Warning

Red Flag Warning – Urgent – High Fire Danger if there are ignitions

High Wind Watch – Potential for damaging high wind warning

High Wind Warning – Urgent high wind potential and possible damaging wind

Are you getting messages to your phone?
<https://inws.ncep.noaa.gov>

Monitoring Weather (wind and humidity)

<https://www.wrh.noaa.gov/map/?obs=true&wfo=sgx>

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weather.gov/sandiego**

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“Filtered_Circuit_Forecast_10_10_2019_V2.xlsx”

Station Name	Station Code	District	Gust Forecast (mph)	Sectionalizing Device	Circuits	Tielines
Sill Hill	SIL	ME	62	79-799R	79	626
Boulder Creek	BOC	ME	49	79-799R	79	626
Crestwood	CWD	ME	48	445-23R, 1215-12R	445, 1215	6931, 629, 6958
Hellhole Canyon	HHC	NE	47	1030-987	1030	
North Boulder Creek	NBC	ME	47	79-799R, 238	79, 238	626
School House Canyon	SHC	RA	47	220-294R	220	
Sherilton Valley	SHV	ME	47	79-673R	79	
Buckman Springs	BMS	ME	46	441-25R	441	629
La Posta	LPT	ME	46	441-23R, 1215-12R	441, 1215	629, 6958
Lucky Five Ranch	LFR	ME	46	79-685R	79	
Round Potrero	RPO	ME	44	157-75R	157	6923
Inaja Park	IJP	RA	43	222-1364R	222	626
West Santa Ysabel	WSY	RA	43	222-1370R	222	637
East Willows Road	EWR	ME	42	358-682F	358	
Hoskings Ranch	HOS	RA	42	222-1364R	222	
North Descanso	NDC	ME	42	79-679R	79	626
Dye Mountain	DYE	RA	41	222-1370R	222	637
Potrero	POT	ME	41	157-84R, 448-23R	157, 448	
Viejas Grade	VGD	ME	41	78-26R	78	
White Star	WST	ME	41	445-21R	445	
Guatay	GTY	ME	40	79-676R	79	629
North Potrero	NPT	ME	40	157-84R, 448-23R	157, 448	
Poomacha	POM	NE	40	214-1122R	214	682
Shockey Truck Trail	STT	ME	40	448-11R	448	
Tierra Del Sol	TDS	ME	40	445-24R	445	
Volcan Mountain	VCM	RA	40	221-19R	221	
West Wynola	WWY	RA	40	221-31R, 222-1364R, JU1, OK1, PE1, SL1	221, 222, JU01, OK01, PE01, SL01	
Witch Creek	WCK	RA	40	222-1370R, 237-30R	222, 237	
Wynola	WYN	RA	40	221-23R, 221-344R	221	
Laguna	LAG	ME	39	440-13R	440	
Crestline	CLN	NE	36	214-583R, CTL1-3R	214, CTL1	
Pine Hills	PIH	RA	35	222-1364R, PE1	222, PE01	
Julian	JUL	RA	31	221-31R, 222-1364R, JU1, OK1, SL1	221, 222, JU01, OK01, SL01	
De Luz	DLZ	NE	28	520-18R, 520-26R	520	
Mt Palomar	PAM	NE	24	214-583R, CTL1	214, CTL1	
Rancho Santa Fe	RSF	NC	24	305-32R, 307-1492R, 1001-1130, SF3-19R	305, 307, 1001, SF03	
Ammo Dump	AMO	NE	23	231, 300	231, 300	
Avocado	AVO	NE	23	520-22R, 521-14R, 521-32R	520, 521	
Valley Center	VLC	NE	22	907-1602, 907-1716R, 908-1201R, 909-17R, 1030-23R	907, 908, 909, 1030	681, 6926
Circle R	CIR	NE	20	350-15R, 354-38R	350, 354	

Station Name	Station Code	District	Gust Forecast (mph)	Sectionalizing Device	Circuits	Tielines
Twin Oaks	TWO	NE	20	205-369R, 206-953R, 599-19R, 859-42R, 1094-7	205, 206, 599, 859, 1094	
Mt Laguna	MLG	ME	19	440-13R	440	

Station Name	Peak Time	Exceeding 95th Percentile Time	99th Time	VRI	CLIMO 95th	CLIMO 99th	CLIMO Max	Reach 95th?	Reach 99th?
Sill Hill	10/10/19 22:00	10/10/19 19:00		Medium	60	81	101	yes	no
Boulder Creek	10/10/19 22:00	10/10/19 20:00		Medium	44	57	72	yes	no
Crestwood	10/10/19 23:00	10/10/19 21:00		Low	47	58	76	yes	no
Hellhole Canyon	10/10/19 23:00	10/10/19 22:00		Low	50	62	82	no	no
North Boulder Creek	10/10/19 23:00	10/10/19 20:00		Medium	42	53	69	yes	no
School House Canyon	10/10/19 23:00	10/10/19 22:00		Low	44	53	66	yes	no
Sherilton Valley	10/10/19 22:00	10/10/19 20:00		Low	42	54	65	yes	no
Buckman Springs	10/10/19 23:00	10/10/19 22:00		Medium	42	55	87	yes	no
La Posta	10/10/19 23:00	10/10/19 22:00		Low	45	54	69	yes	no
Lucky Five Ranch	10/10/19 23:00	10/10/19 22:00		Medium	44	57	69	yes	no
Round Potrero	10/10/19 11:00	10/10/19 9:00		Low	40	50	65	yes	no
Inaja Park	10/10/19 23:00	10/10/19 22:00		Medium	43	53	66	yes	no
West Santa Ysabel	10/10/19 23:00	10/10/19 20:00		Low	42	52	75	yes	no
East Willows Road	10/10/19 22:00	10/10/19 22:00		Low	46	60	72	no	no
Hoskings Ranch	10/10/19 21:00	10/10/19 20:00		Medium	40	52	63	yes	no
North Descanso	10/10/19 22:00	10/10/19 22:00		Low	43	52	69	no	no
Dye Mountain	10/10/19 23:00	10/10/19 23:00		Low	42	54	63	no	no
Potrero	10/10/19 11:00	10/10/19 9:00		Low	37	46	60	yes	no
Viejas Grade	10/10/19 22:00	10/10/19 20:00		Low	40	53	77	yes	no
White Star	10/10/19 23:00	10/10/19 13:00		N/A	37	44		yes	no
Guatay	10/10/19 23:00	10/10/19 19:00		Medium	27	36	46	yes	yes
North Potrero	10/10/19 11:00	10/10/19 9:00		Low	38	46	55	yes	no
Poomacha	10/10/19 23:00	10/10/19 23:00		Medium	37	47	56	yes	no
Shockey Truck Trail	10/10/19 11:00	10/10/19 9:00		Medium	37	46	61	yes	no
Tierra Del Sol	10/10/19 23:00	10/10/19 13:00		Medium	37	44	54	yes	no
Volcan Mountain	10/10/19 13:00	10/10/19 13:00		Low	40	50	60	yes	no
West Wynola	10/10/19 23:00	10/10/19 22:00		Medium	36	46	56	yes	no
Witch Creek	10/10/19 23:00	10/10/19 22:00		Low	39	49	62	yes	no
Wynola	10/10/19 21:00	10/10/19 20:00		Medium	39	45	54	yes	no
Laguna	10/10/19 23:00	10/10/19 22:00		High	35	44	56	yes	no
Crestline	10/10/19 23:00	10/10/19 22:00		High	34	45	54	yes	no
Pine Hills	10/10/19 23:00	10/10/19 22:00		High	30	38	53	yes	no
Julian	10/10/19 21:00	10/10/19 20:00		High	30	37	44	yes	no
De Luz	10/10/19 11:00	10/10/19 11:00		High	27	33	36	yes	no
Mt Palomar	10/10/19 15:00	10/10/19 15:00		High	23	30	42	yes	no
Rancho Santa Fe	10/10/19 23:00	10/10/19 23:00		High	24	30	37	yes	no
Ammo Dump	10/10/19 11:00	10/10/19 11:00		High	23	29	40	yes	no
Avocado	10/10/19 11:00	10/10/19 11:00		High	22	28	39	yes	no
Valley Center	10/10/19 22:00	10/10/19 22:00		High	22	27	35	yes	no
Circle R	10/10/19 11:00	10/10/19 11:00		High	19	24	33	yes	no

Station Name	Peak Time	Exceeding 95th Percentile Time	99th Time	VRI	CLIMO 95th	CLIMO 99th	CLIMO Max	Reach 95th?	Reach 99th?
Twin Oaks	10/10/19 23:00	10/10/19 23:00		High	18	23	27	yes	no
Mt Laguna	10/10/19 23:00	10/10/19 23:00		High	18	23	29	yes	no

Email:

**“FW 7-Day FPI Outlook Issued 10-10-19 Red Flag Warning
Today and Tomorrow”**

FW: 7-Day FPI Outlook Issued 10/10/19 *Red Flag Warning Today and Tomorrow*******Meteorology** <Meteorology@semprautilities.com>

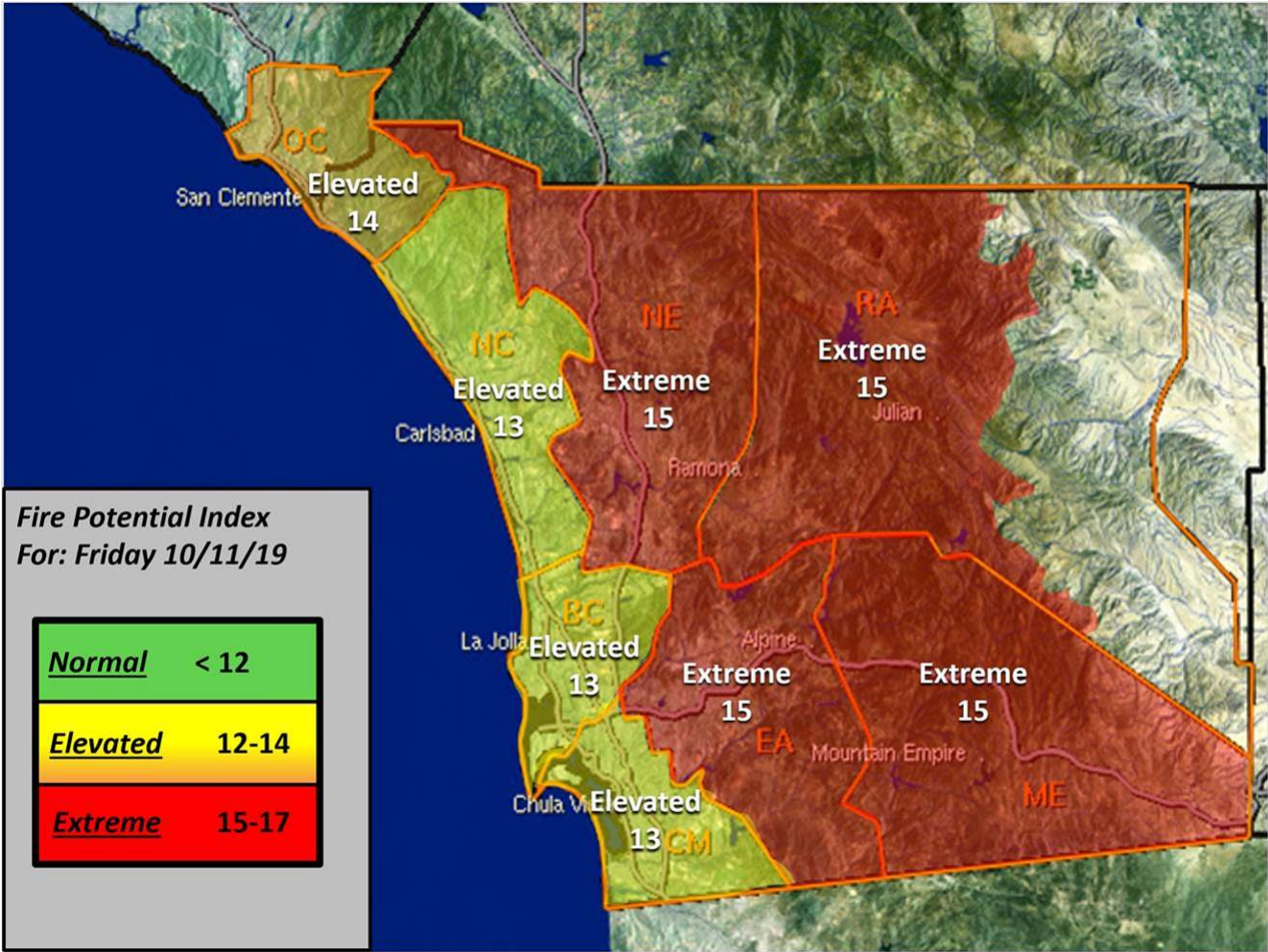
Thu 10/10/2019 8:30 AM

To: DAgostino, Brian <BDAgostino@sdge.com>; Vanderburg, Steven C <SVanderburg@sdge.com>; Giannecchini, Kathryn <KGiannecchini@sdge.com>; Arends, Chris J <CArends@sdge.com>

From: Bowers, Carrie L**Sent:** Thursday, October 10, 2019 3:30:25 PM (UTC+00:00) Monrovia, Reykjavik**To:** Vanderburg, Steven C**Cc:** Meteorology**Subject:** 7-Day FPI Outlook Issued 10/10/19 ***Red Flag Warning Today and Tomorrow*****Executive Summary:**

- Santa Ana winds will increase into the evening, peaking tomorrow morning; *see fire discussion for details*
- A Red Flag Warning is in effect for Orange County and the SD County Mountains and Valleys through tomorrow
- Extreme FPI in ME and RA today, extending into NE and EA on tomorrow
- All coastal districts (including OC) will be Elevated through Sunday
- Mild conditions Sunday into next week

Fire Potential Index for Friday 10/11/19:



Seven Day FPI Outlook:

	Thu 10/10	Fri 10/11	Sat 10/12	Sun 10/13	Mon 10/14	Tue 10/15	Wed 10/16	Thu 10/17
ME	Extreme 15	Extreme 15	Elevated 14	Elevated 13	Elevated 13	Elevated 13	Elevated 12	Elevated 12
RA	Extreme 15	Extreme 15	Elevated 14	Elevated 13	Elevated 13	Elevated 13	Elevated 12	Elevated 12
EA	Elevated 14	Extreme 15	Elevated 13	Elevated 13	Elevated 12	Elevated 12	Elevated 12	Elevated 12
NE	Elevated 14	Extreme 15	Elevated 13	Elevated 13	Elevated 12	Elevated 12	Elevated 12	Elevated 12
	Elevated	Elevated	Elevated	Elevated	Elevated	Normal	Normal	Normal

OC	14	14	13	12	12	11	11	11
NC	Elevated 12	Elevated 13	Elevated 12	Elevated 12	Normal 11	Normal 11	Normal 11	Normal 11
BC	Elevated 12	Elevated 13	Elevated 12	Elevated 12	Normal 11	Normal 11	Normal 11	Normal 11
CM	Elevated 12	Elevated 13	Elevated 12	Elevated 12	Normal 11	Normal 11	Normal 11	Normal 11

Normal	Elevated	Extreme
< 12	12-14	15-17

FPI Discussion: A Red Flag Warning is in effect for the San Diego County Inland Valleys and Mountains (Zones 250 & 258) until 6 pm tomorrow (10/11). A Red Flag Warning is also in effect for Orange County Coastal Areas (Zone 552) until 8 am Friday, and OC Inland Areas (Zone 554) until 6 pm Friday. The FPI is Extreme in Mountain Empire and Ramona today, extending to include Northeast and Eastern tomorrow. All coastal districts, including Orange County, will be Elevated through Sunday. Details provided below:

- **Timing:** Santa Ana winds will ramp up through the afternoon and evening, peak tomorrow morning, then decrease through late afternoon tomorrow. Weak easterly winds will continue Saturday morning, but will be isolated to Mountain Empire and Ramona.
- **Peak Winds:**
 - Today- backcountry wind gusts in the 30-40 mph range, with the windiest locations (Sill Hill) seeing isolated gusts of 50-60 mph after sunset
 - Tomorrow morning-
 - Backcountry gusts of 40-50 mph with isolated stronger gusts in wind-prone areas including up to 75 mph at Sill Hill
 - Coastal areas may see gusts of 15-25 mph with isolated areas of North Coast seeing gusts up to 30 mph
 - Saturday morning may bring gusts of 20-30 mph over mountains and foothills, turning westerly in the evening
- **Temperatures:** High temperatures west of the mountains will be mainly in the mid to upper 80s through Saturday
- **Humidity:** Widespread single digit humidities are expected to remain in place through Sunday with little to no overnight recovery
- **Fire Potential:** With very dry conditions widespread today through Sunday, and gusty east winds in Orange County and inland areas through tomorrow, fire potential will be high throughout the region. Little to no overnight humidity recovery will progressively dry the fuel moistures through at least Sunday. Fires will ignite easily, and should an ignition occur, rapid fire growth can be expected.
- **Santa Ana Wildfire Threat Index:** This event is currently rated Moderate for today and Friday. Please visit <http://sawti.fs.fed.us/> for more details.
- **Extended Outlook:** Westerly winds will begin at the coast on Saturday and spread into inland areas Sunday. The return of significantly higher humidities may not occur until Tuesday, which will keep fuel moistures very low until then. Otherwise, fair and mild conditions should persist at least through the middle of next week.

Santa Ana Wildfire Threat Index for San Diego County:



Thu 10/10	Fri 10/11	Sat 10/12	Sun 10/13	Mon 10/14	Tue 10/15
Moderate	Moderate	No Rating	No Rating	No Rating	No Rating

No-Rating	Marginal	Moderate	High	Extreme
Santa Ana winds are not expected or will not contribute to significant fire activity.	Upon ignition, fires <i>may</i> grow rapidly.	Upon ignition, fires <i>will</i> grow rapidly and <i>will</i> be difficult to control.	Upon ignition, fires will grow <i>very</i> rapidly and will be <i>very</i> difficult to control.	Upon ignition, fires will have extreme growth and will be uncontrollable.

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Fire Science & Climate Adaptation
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(619) 889-4523

“I.19-11-013 CalPA-SDGE DR6 Q2 SAWTI”

The Santa Ana Wildfire Threat Index: Methodology and Operational Implementation

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University of California, Los Angeles, Los Angeles, California

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San Diego Gas and Electric, San Diego, California

(Manuscript received 19 October 2015, in final form 30 June 2016)

ABSTRACT

Santa Ana winds, common to Southern California from the fall through early spring, are a type of down-slope windstorm originating from a direction generally ranging from $360^{\circ}/0^{\circ}$ to 100° and are usually accompanied by very low humidity. Since fuel conditions tend to be driest from late September through the middle of November, Santa Ana winds occurring during this time have the greatest potential to produce large, devastating fires upon ignition. Such catastrophic fires occurred in 1993, 2003, 2007, and 2008. Because of the destructive nature of such fires, there has been a growing desire to categorize Santa Ana wind events in much the same way that tropical cyclones have been categorized. The Santa Ana wildfire threat index (SAWTI) is a tool for categorizing Santa Ana wind events with respect to anticipated fire potential. The latest version of the index has been a result of a three-and-a-half-year collaboration effort between the USDA Forest Service, the San Diego Gas and Electric utility (SDG&E), and the University of California, Los Angeles (UCLA). The SAWTI uses several meteorological and fuel moisture variables at 3-km resolution as input to the Weather Research and Forecasting (WRF) Model to generate the index out to 6 days. In addition to the index, a 30-yr climatology of weather, fuels, and the SAWTI has been developed to help put current and future events into perspective. This paper outlines the methodology for developing the SAWTI, including a discussion on the various datasets employed and its operational implementation.

1. Introduction

From the fall through early spring, offshore winds, or what are commonly referred to as Santa Ana winds, occur over Southern California from the coastal mountains westward and from Ventura County southward to the Mexican border. These synoptically driven wind events vary in frequency, intensity, and spatial coverage from month to month and from year to year, thus making them difficult to categorize. Most of these wind events are associated with mild to warm ambient

surface temperatures $\geq 18^{\circ}\text{C}$ and low surface relative humidity $\leq 20\%$. However, during the late fall and winter months, these events tend to be associated with lower surface temperatures as a result of the air mass over the Great Basin originating from higher latitudes and other seasonal effects. There are a variety of ways to define a Santa Ana event through the analysis of local and synoptic-scale surface pressure and thermal distributions across Southern California (Raphael 2003). We view these offshore winds from a wildfire potential perspective, taking into consideration both the fuel characteristics and weather. As we have found, the index discussed herein provides a robust descriptor of both Santa Ana winds and the potential for wildfire activity. Used in conjunction with a mean sea level pressure (MSLP) map type, this is a powerful method for separating Santa Ana wind events from the more

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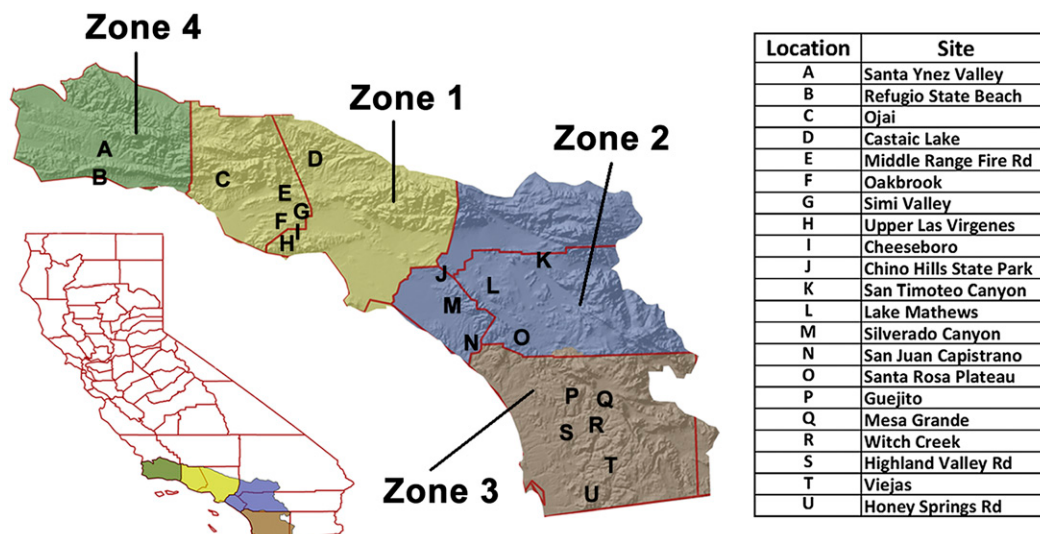


FIG. 1. Map of SAWTI zones. Inset shows SAWTI zones in reference to the state of CA. Letters denote locations of NDVI grassland sites with underlying topography shaded. Site names are provided in the lookup table to the right. County boundaries shown in red.

typical nocturnal offshore flows that occur throughout the coastal and valley areas (i.e., land breeze) during the year.

From 21 through 23 October 2007, Santa Ana winds generated multiple large catastrophic fires across Southern California (Moritz et al. 2010). Most notable was the Witch Creek fire in San Diego County, where wind gusts of 26 m s^{-1} were observed at the Julian weather station along with relative humidity values of $\approx 5\%$. However, high-resolution model simulations at 667 m showed that wind velocities were much higher in unsampled areas (Cao and Fovell 2016). This event became the catalyst for the development of a comprehensive Santa Ana wildfire potential index to better inform fire agencies, first responders, private industry, and the general public about the severity of an approaching event. This index could also help augment fire weather watches and red flag warnings from the National Weather Service by providing value-added information about an impending event.

The Predictive Services Unit, functioning out of the Geographic Area Coordination Center (GACC) in Riverside, California, is composed of several meteorologists employed by the USDA Forest Service. In 2009, Predictive Services began working on an index to categorize Santa Ana wind events according to the potential for a large fire to occur (Rolinski et al. 2011). This unique approach addresses the main impact Santa Ana winds can have on the population of Southern California beyond the causal effects of windy, dry weather. Following on, and improving upon this work, the Forest Service (through Predictive Services) collaborated

during a three-and-a-half-year period with the San Diego Gas and Electric utility (SDG&E) and the University of California, Los Angeles (UCLA), to develop the Santa Ana wildfire threat index (SAWTI). This index employs a gridded 3-km model to not only assess meteorological conditions, but also incorporates an estimation of fuel moisture to determine the likelihood of rapid fire growth during Santa Ana winds.

The SAWTI domain covers the coastal, valley, and mountain areas of Southern California from Point Conception southward to the Mexican border. This area has been divided into four zones based in part on the different offshore flow characteristics that occur across the region (Fig. 1). Zone 4, which covers Santa Barbara County and was the last zone to be included into the index (thus the reason for the discontinuity within the sequential order of zones going from north to south), does not typically experience Santa Ana winds in the classic sense. Strong northwest-to-north winds in this zone can either precede a Santa Ana wind event or can occur independently (typically in the summer), which in the latter case are more commonly known as “sundowners” (Blier 1998). In both cases, these downsloping winds are common to the south slopes of the Santa Ynez Mountains, an east–west coastal range that runs parallel to, and a few miles inland from, the shoreline. Although not frequent, significant fire activity associated with these winds in this zone has occurred in the past, which is why this geographic area is now represented in the index. Santa Ana winds across zones 1 and 2 are primarily a result of offshore surface pressure gradients (locally and/or synoptically) interacting with the local

terrain to produce gap winds through the Soledad Canyon, the Cajon Pass, and the Banning Pass (Hughes and Hall 2010; Cao and Fovell 2016). These winds also tend to precede the Santa Ana winds that occur across San Diego County by 12–24 h. Across zone 3, offshore winds take on a more “downslope windstorm” characteristic driven largely by the tropospheric stability (Cao and Fovell 2016). Other factors that led to the division of the zones were changes in terrain, National Weather Service Forecast Office boundaries, and local news media market areas. The SAWTI is more than a tool for meteorologists and fire agency managers to assess the severity of Santa Ana winds; it is also a tool for the general public to help better prepare for impending events that could lead to catastrophic fires. Therefore, the idea of displaying the product via zones keeps the index simple and easy to understand for all user groups. The following discussion centers around the assessment of fire potential related to Santa Ana winds, the methodology behind the weather and fuel components of the index, and its operational implementation.

2. Methodology

a. Large fire potential: Weather component

We define a large fire within the four SAWTI zones to be 100 ha. The potential for an ignition to reach or exceed this value depends on a number of components, for example, various meteorological and fuel conditions, suppression strategy, topography, accessibility, and resource availability. We achieved this threshold by employing a historical fire database that was constructed by Predictive Services. This database was assembled by collecting fire occurrence data (1990–2013) from all state and federal fire agencies within the confines of California. For example, some of the fire agencies include the USDA Forest Service, the Bureau of Land Management, the National Park Service, and the California Department of Forestry and Fire Protection (CALFIRE) to mention a few. This database contains information such as ignition date, acres burned, containment date, etc., and contains 32 683 records. The value of 100 ha was achieved by determining what the largest fire was for each day within the database and then taking the 95th percentile of all daily largest fires. The determination of this semiempirical threshold was also guided by decades of experience guiding coordinated attacks on wildfires throughout Southern California. Moreover, in most cases when this threshold is exceeded, the GACC becomes engaged in resource mobilization to assist in fire suppression. Current methods for evaluating fire potential include various indices from

the National Fire Danger Rating System (NFDRS; Bradshaw et al. 1983) and from the Canadian Forest Fire Danger Rating System (CFFDRS; Preisler et al. 2008). The Fosberg fire weather index (FFWI) is one such metric and is a function of wind speed, humidity, and temperature with output values ranging from 0 to 100 (Fosberg 1978). While the FFWI may show elevated output values for a Santa Ana wind event, it can also show elevated values for any day therefore making it too generic for our purposes.

Assuming an aggressive suppression strategy is employed with adequate resource availability in an easily accessible area, large fire potential (LFP) can be simplified into a function involving fuel and meteorological conditions preceding, during, and following the time of ignition. From observation and experience, the two weather variables that contribute most toward fire growth during a Santa Ana wind event are wind velocity and the amount of dry air present near the surface. To illustrate this concept, we examined the difference between two Southern California fire regimes (Jin et al. 2015) consisting of fire activity during the summer, versus only during the fall when Santa Ana winds begin to increase in frequency (Figs. 2 and 3). It is easy to see that most of the fire activity during the summer occurs in low-wind situations with varying dewpoint depression values. However, fires burning in the autumn are commonly associated with stronger winds and higher dewpoint depression values. Therefore, based on operational experience, observations, and model data, we believe the potential for a new ignition to reach or exceed 100 ha based solely on weather conditions during a Santa Ana wind event is best expressed by the following equation:

$$\text{LFP}_w = 0.001 W_s^2 D_d, \quad (1)$$

where W_s is the near-surface (10 m AGL) sustained wind speed (m h^{-1}) and D_d is the near-surface dewpoint depression ($^{\circ}\text{F}$). It should be noted that this equation was validated by examining dynamically downscaled reanalysis data across Southern California for the month of October from 1979 to 2010. It has been suggested that wind speed has an exponential effect on the spread of fire among finer fuels such as grass and brush, and that wind can also have the same effect on fire spread as a fire burning upslope with little or no wind (Rothermel 1972). Dewpoint depression ($T - T_d$) depicts the dryness at the surface well and affects the moisture content of vegetation. Also, dewpoint depression can sometimes differentiate better between warm and cold offshore events than relative humidity can. In our dataset, it has been noted that larger dewpoint depression values ($D_d \geq 24^{\circ}\text{C}$) have

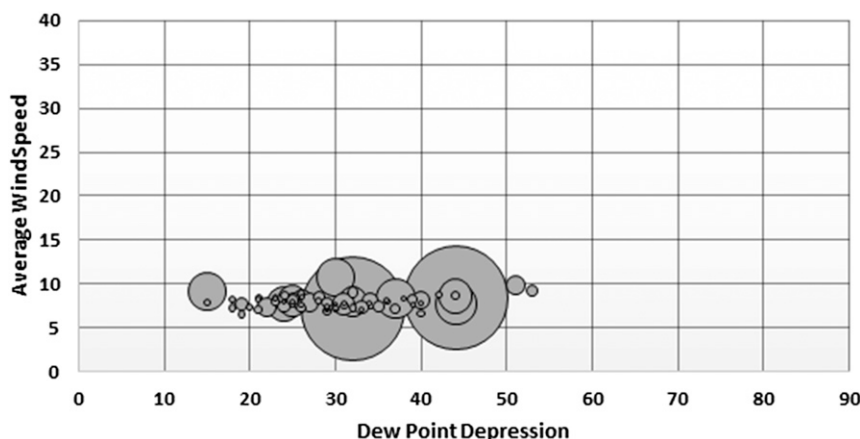


FIG. 2. Relationship of large fire (≥ 100 ha) occurrence and relative size with respect to average wind speed and dewpoint depression across zone 1 between 1 Jun and 20 Sep from 1992 to 2012. Bubble size represents relative fire size.

mainly been associated with warm events. While this may seem trivial, cold Santa Ana wind events (surface ambient temperatures $< 16^{\circ}\text{C}$) are usually not associated with large fires (according to our historical fire database previously mentioned). This may be due in part to lower fuel temperatures because in those cases more time would be needed to reach the ignition temperature. Another reason is that colder events are sometimes preceded by precipitation either by a few days or by a few weeks, which would cause fuels to be less receptive to new ignitions. These are the primary reasons why temperature was excluded from (1), although it has been incorporated indirectly through the use of D_d and in the fuels component that will be discussed in the following section. Finally, we note that while (1) bears some resemblance to the FFWI, a comparison of daily outputs of FFWI and LFP_w revealed that LFP_w provides significantly greater contrast between Santa Ana days and non-Santa Ana days. Therefore,

these results favored LFP_w as being the more appropriate equation for our purposes.

b. Large fire potential: Fuel moisture component

In addition to the meteorological conditions, LFP is also highly dependent on the state of the fuels. Given the complexity of the fuel environment (i.e., fuel type, continuity, loading, etc.), we decided to focus more specifically on fuel moisture since that aspect plays a critical role in the spread of wildfires (Chuvieco et al. 2004). For our purposes, we have condensed fuel moisture into three parameters: 1) dead fuel moisture, 2) live fuel moisture, and 3) the state of green-up of the annual grasses. Each of these aspects of fuel moisture is complex and will be defined more specifically later. We combined these moisture variables into one term, which we refer to as the fuel moisture component (FMC). While the variables within the FMC often act in concert with each other, there are times when they are out of

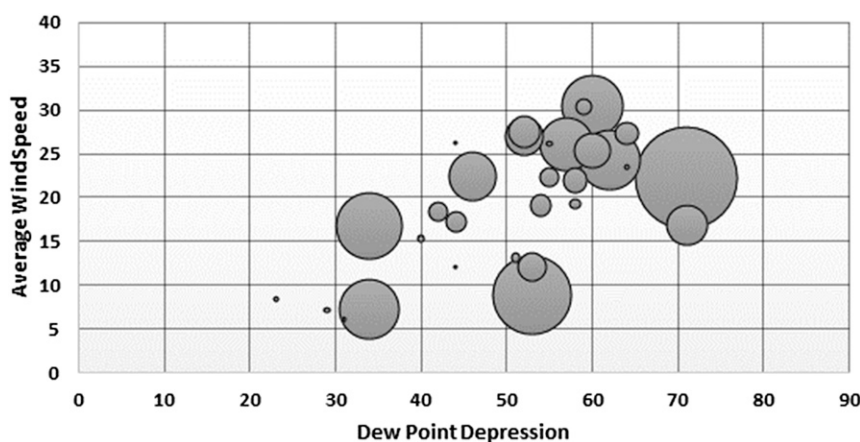


FIG. 3. As in Fig. 2, but between 21 Sep and 31 Dec.

phase with one another as a result of the variability in precipitation (frequency and amount) that occurs across Southern California during the winter. Through a comprehensive empirical investigation, the governing equation for FMC can be expressed as

$$\text{FMC} = \left\{ 0.1 \left[\left(\frac{\text{DL}}{\text{LFM}} - 1 \right) + G_{\text{ag}} \right] \right\}^{1.7}, \quad (2)$$

where DL is the dryness level consisting of the energy release component (ERC) and the 10-h dead fuel moisture time lag $\text{DFM}_{10\text{hr}}$. Dead fuel refers to nonliving plant material whose moisture content responds only to ambient moisture. Dead fuel is typically grouped into “time lag” classes according to diameter as follows: 0.20 cm, $\text{DFM}_{1\text{hr}}$; 0.64 cm, $\text{DFM}_{10\text{hr}}$; 2.00 cm, $\text{DFM}_{100\text{hr}}$; and 6.40 cm, $\text{DFM}_{1000\text{hr}}$. Live fuel moisture (LFM) is a sampling of the moisture content of the live fuels indigenous to the local region, and G_{ag} is the degree of green-up of the annual grasses. Currently, we are making the assumption that all the terms in (2) have equal weight, but further study may lead to future modifications.

1) DRYNESS LEVEL

The DL is a function of ERC and $\text{DFM}_{10\text{hr}}$ calibrated to historical fire occurrence across Southern California with unitless values ranging from 1 to 3. ERC is a relative index of the amount of heat released per unit area in the flaming zone of an initiating fire and is composed of live and dead fuel moisture as well as temperature, humidity, and precipitation (Bradshaw et al. 1983). While ERC is a measure of potential energy, it also serves to capture the intermediate- to long-term dryness of the fuels with unitless values generally ranging from 0 to 100 (using NFDRS fuel model G). The $\text{DFM}_{10\text{hr}}$ represents fuels in which the moisture content is exclusively controlled by environmental conditions (Bradshaw et al. 1983). Output values of $\text{DFM}_{10\text{hr}}$ are in grams per gram expressed as a percentage ranging from 0 to 60. In the case of the $\text{DFM}_{10\text{hr}}$, this is the time required for dead fuels (0.64–2.54 cm in diameter) to lose approximately two-thirds of their initial moisture content (Bradshaw et al. 1983). Thus, a DL of 1 indicates that dead fuels are moist, 2 represents average dead fuel dryness, and a 3 indicates that the dead fuels are drier than normal.

2) LIVE FUEL MOISTURE

The observed LFM is the moisture content of live fuels (e.g., grasses, shrubs, and trees) expressed as a ratio of the weight of water in the fuel sample to the oven dry weight of the fuel sample (Pollet and Brown 2007). Soil moisture as well as soil and air temperature govern the physiological activity, which results in changes in fuel

moisture (Pollet and Brown 2007). LFM is a difficult parameter to evaluate because of the irregularities associated with observed values. For instance, samples of different species of native shrubs are normally taken twice a month by various fire agencies across Southern California. However, the sample times often differ between agencies and the equipment used to dry and weigh the samples may vary from place to place. In addition, sample site locations are irregular in their distribution and observations from these sites may be taken sporadically. This presents a problem when we attempt to assess LFM over the region shown in Fig. 1.

Apart from taking fuel samples, there are several ways of estimating LFM using meteorological variables, soil water reserves, solar radiation, etc. (Castro et al. 2003). In particular, we developed an approach to modeling the LFM of chamise or greasewood (*Adenostoma fasciculatum*), a common shrub that grows within the chaparral biome in Southern California and is particularly flammable because of its fine, needlelike leaves and other characteristics (Countryman and Philpot 1970; Fovell et al. 2016, manuscript submitted to *Int. J. Wildland Fire*). This strategy makes use of historically observed LFM data from 10 sampling sites across Southern California and soil moisture from the 40–100-cm layer ($\text{SMOIS}_{40-100\text{cm}}$) from the North American Land Data Assimilation System, phase 2 (NLDAS-2). At each sampling site, LFM deviations from climatology are predicted using $\text{SMOIS}_{40-100\text{cm}}$ departures from its own annual cycle. A key element of the model is the incorporation of a 22-day lag between $\text{SMOIS}_{40-100\text{cm}}$ and LFM that improved the model fits. This is because a certain period of time elapses during which water percolates downward through the soil layers and then is drawn back up through the root system of the plant. This time can vary between 4 and 43 days depending on the evaporative conditions, soil structure, and site elevation. An average of this time lag over all the stations equated to 22 days. Current LFM values observed are relatable to gridded NLDAS-2 soil moisture anomalies from about 3 weeks earlier.

That approach, although quite skillful, results in site-specific equations not easily generalized across Southern California. The SAWTI index presently makes use of a simplified version of this strategy, applied to all grid points in the domain. For a given day, the model can be expressed as

$$\text{LFM} = (\text{SMOIS}_{40-100\text{cm}22\text{days}} - \text{SMOIS}_m) + 82, \quad (3)$$

where $\text{SMOIS}_{40-100\text{cm}22\text{days}}$ is the soil moisture of the 40–100-cm layer from 22 days earlier and SMOIS_m is the mean soil moisture from 2009 to 2012 for that same date.

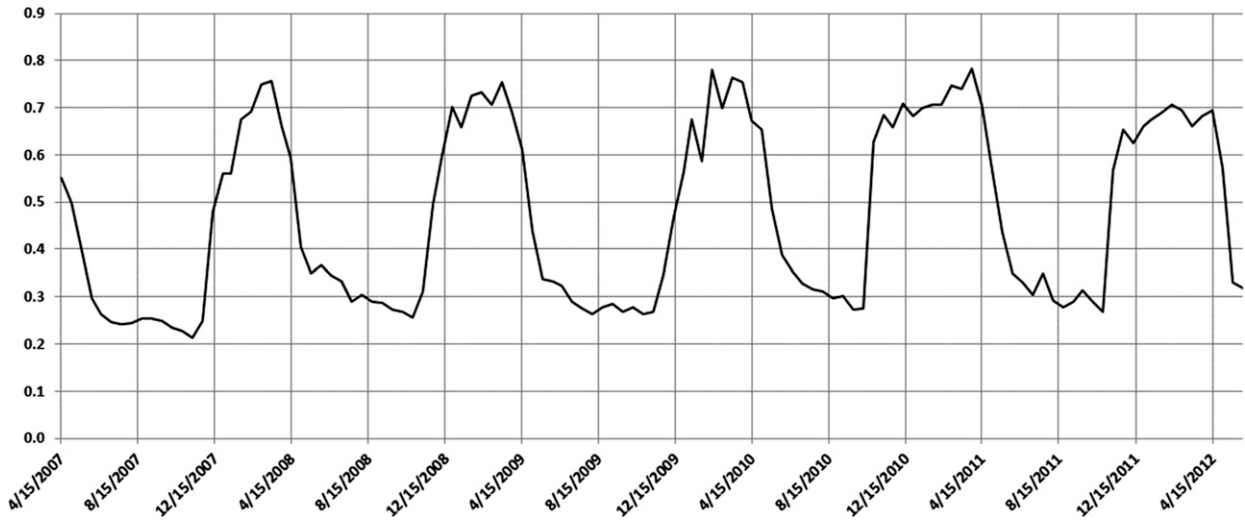


FIG. 4. Sample annual NDVI output.

The empirically selected constant of 82 roughly approximates the annual mean LFM over a large variety of sites.

3) ANNUAL GRASSES G_{ag}

Following the onset of significant wetting rains, new grasses will begin to emerge in a process called green-up. While the timing and duration of this process fluctuate from year to year, some degree of green-up usually occurs by December across Southern California. During the green-up phase, grasses will begin to act as a heat sink, thereby preventing new ignitions and/or significantly reducing the rate of spread among new fires. By late spring these grasses begin to cure with the curing phase normally completed by mid-June. In (2), G_{ag} is a value that quantifies the said green-up and curing cycles of annual grasses.

The value of G_{ag} is derived from the Moderate Resolution Imaging Spectroradiometer (MODIS) NDVI dataset at a resolution of 250 m for select pixels consisting solely of grasslands. NDVI is further defined by red and near-infrared (NIR) bands in the following equation:

$$NDVI = \frac{\rho_{NIR} - \rho_b}{\rho_{NIR} + \rho_b}, \quad (4)$$

where b is the reflectance in band b (Clinton et al. 2010). It can be shown that NDVI values for Southern California grasslands generally range from about 0.25 (± 0.05) to 0.75 (± 0.05) for an average rainfall year (Fig. 4). There is evidence that NDVI is affected by soil color (Elmore et al. 2000), which may explain the NDVI differences (± 0.05) seen among the selected Southern California grassland locations.

We give G_{ag} a rating of from 0 to 5 based on NDVI data, where 0 is green and 5 is fully cured. When

applying the methodology discussed by White et al. (1997) to the general range of Southern California grasslands, green-up is estimated to have occurred when NDVI exceeds 0.50. However, we have found that this value can be closer to 0.64 for some sites, and therefore NDVI values greater than 0.64 are assigned a value of 0, or green. Furthermore, NDVI values less than or equal to 0.39 are assigned a value of 5. This is because NDVI values are observed to be below 0.39 for all grassland sites during the dry season when grasses are known to be fully cured. A linear relationship exists between NDVI-derived values of G_{ag} and fire occurrence in Southern California (Fig. 5). For this reason, the transition between green and fully cured (or vice versa) was given a rating of from 1 to 4 in NDVI increments of 0.05 (Table 1).

To model NDVI, we used MODIS-derived NDVI biweekly data observed at 21 stations shown in Fig. 1, interpolated to daily frequency using cubic splines. The data availability period was January 2004–June 2012. For ease of implementation, our goal was to create a simple, yet skillful equation to capture the temporal variation of NDVI:

$$NDVI = \alpha + \beta_1 \cos(2\pi DOY/LOY) + \beta_2 PRECIP_{accum} + \beta_3 RH_{avg} + \beta_4 VEG_{frac} + \beta_5 SMOIS_{40-100cm}, \quad (5)$$

where DOY is the 1 January–based day of the year and LOY is the length of the year in days. The regressor $PRECIP_{accum}$ is the 1 September–based annually accumulated precipitation (mm), RH_{avg} is the 30-day running averaged relative humidity, VEG_{frac} is the surface vegetation fraction (0–1), and $SMOIS_{40-100cm}$ is the soil moisture content of the 40–100-cm depth ($kg\ m^{-3}$). This

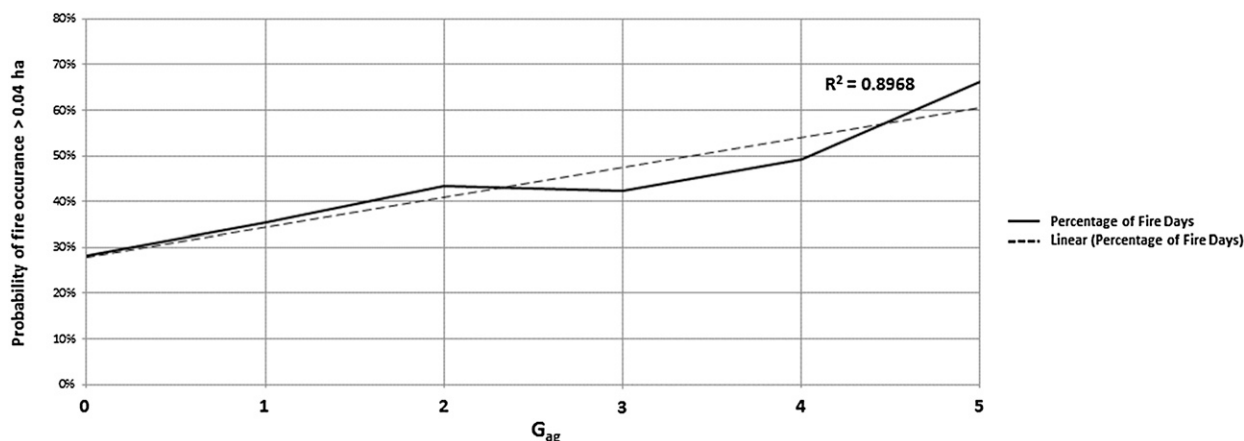


FIG. 5. Probability of fires ≥ 0.04 ha predicted by NDVI-derived G_{ag} for zone 3.

equation was the result of the “random forest” selection and stepwise regression applied to a large number of meteorological candidate regressors; see Cao (2015) for more information. The R^2 of the model is 0.73; see Table 2 for coefficient values.

We applied this model to the 21 sites in the four zones shown in Fig. 1. It is recognized that at some stations and times, the NDVI predictions are somewhat out of phase (i.e., the up and down ramps are too early or too late) with the observations, and the peaks are over- or underpredicted at different locations and times. The marked drought year of 2007 is clearly a problem at some locations, especially in zone 2. However, considering the fact that this is a simple universal model with only five regressors applied across Southern California, we believe it has shown adequate skill overall (Cao 2015).

c. Large fire potential: Weather and fuels

Given our derived expression for fuel characteristics, we can now predict large fire potential during Santa Ana wind events, taking into consideration both the weather and the fuels. FMC modifies (1) in cases where fuels have not fully cured and are still inhibiting fire spread. Output values of FMC range from 0 to 1, where 0 represents wet fuels and 1 denotes dry fuels. This modifier can become so influential that it will greatly reduce or

even eliminate the potential for large fire occurrence despite favorable meteorological conditions for rapid fire growth. So the final equation for large fire potential becomes

$$\text{LFP} = 0.001 W_s^2 D_d \text{FMC}. \quad (6)$$

The value of the incorporation of fuel moisture predictions into the index is illustrated in Fig. 6. For example, examination of the period between September 2008 and May 2009 shows a number of significant Santa Ana wind events indicated by the spikes in LFP_w . The difference between LFP_w and LFP is small during the fall months attributed to high FMC values. This is confirmed by viewing the relatively close spatial agreement between LFP_w and LFP (Fig. 7). In contrast, large differences occur after significant winter rains commence (Fig. 8). Large wildfires had occurred during each of the spikes noted in the fall while little fire activity was recorded despite the LFP_w spikes during January. This is precisely because of low FMC values, which illustrates the critical role that fuels play in this index.

3. Operational SAWTI

a. Model configuration

The data ingested to compute the four-zone, 6-day LFP operational forecasts come from multiple sources

TABLE 1. Relationship between NDVI and greenness.

NDVI	G_{ag} No.	Description
$\text{NDVI} > 0.64$	0	Green
$0.59 < \text{NDVI} \leq 0.64$	1	
$0.54 < \text{NDVI} \leq 0.59$	2	
$0.49 < \text{NDVI} \leq 0.54$	3	
$0.39 < \text{NDVI} \leq 0.49$	4	
$0 \leq \text{NDVI} \leq 0.39$	5	Cured

TABLE 2. Selected NDVI regressors.

Coef	Value
α	-0.314 867
β_1	0.112 535 92
β_2	1.44×10^{-5}
β_3	0.003 556 47
β_4	0.911 360 168
β_5	0.002 412 815

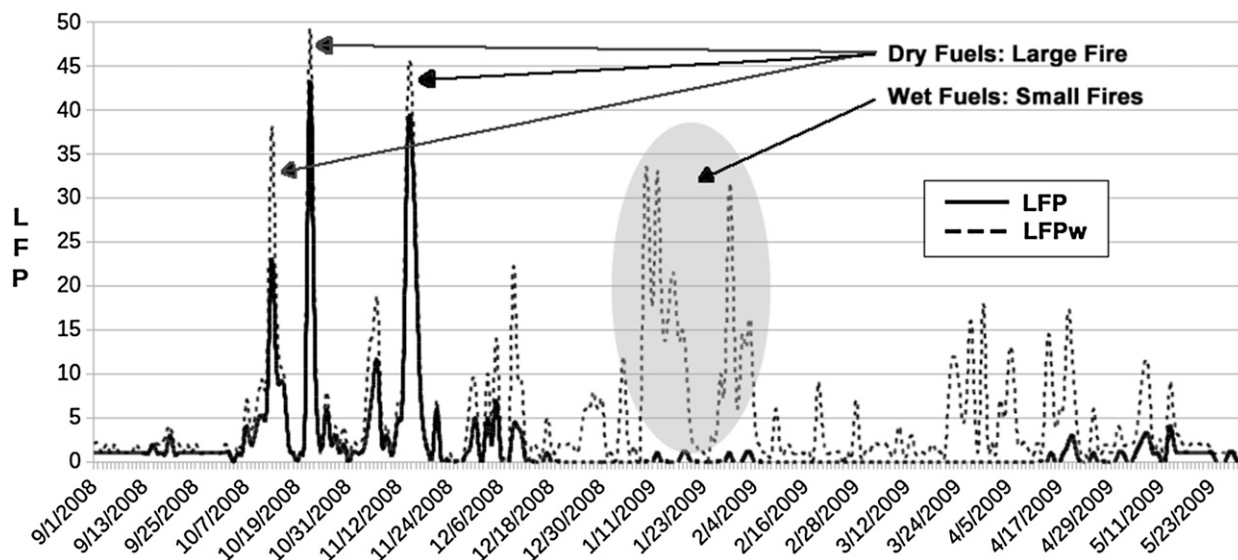


FIG. 6. Comparison of LFP_w and LFP time series for zone 1 during the period spanning September 2008–May 2009. For large fires that occurred in October and November of 2008, relatively dry fuels (LFP , solid black line) accompanied the dry and windy weather (LFP_w , dashed gray line). In contrast, January–February of 2009 experienced peaks of windy and dry conditions (LFP_w) accompanied by moist fuels (LFP) and, as a result, no fires grew larger than 100 ha.

at different temporal and horizontal resolutions ranging from hourly to daily, and from 3 to 12.5 km, respectively (Fig. 9). To reduce the exposure to error in fields with long accumulation periods, we sourced input variables for LFM and NDVI from the NLDAS-2 data (constructed using a land surface model in conjunction with assimilated observations and atmospheric model output). In contrast, hourly DFM and ERC values are predicted using offline models (Nelson 2000; Carlson et al. 2007; NFDRS) forced by WRF weather output.

DFM and ERC are calculated from meteorological variables predicted using WRF version 3.5 (Skamarock et al. 2008), run at 3- and 6-km horizontal resolution. We selected a WRF configuration that minimized errors

with respect to near-surface temperature, winds, and dewpoint during Santa Ana wind events (Cao 2015; Cao and Fovell 2016). This configuration includes the simple WRF single-moment 3-class microphysics scheme (Hong et al. 2004), the GCM version of the Rapid Radiative Transfer Model (RRTMG) shortwave and longwave radiation schemes (Iacono et al. 2008), the MM5 Monin–Obukhov surface layer scheme, and the Asymmetrical Convective Model version 2 boundary layer scheme (Pleim 2007). The Noah land surface model (Tewari et al. 2004) with four soil layers was used in conjunction with the MODIS land-use dataset. Each operational WRF forecast dynamically downscales the 12-km-resolution 0000 and 1200 UTC North American

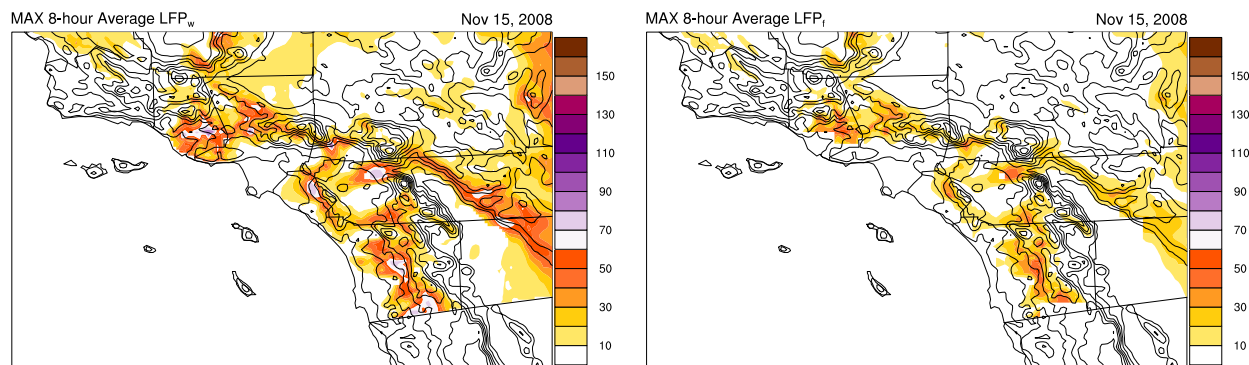


FIG. 7. Average (left) LFP_w and (right) LFP from 0800 to 1500 LST during a Santa Ana event on 15 Nov 2008. This offshore event was accompanied by the Freeway Complex fire, which burned over 12 141 ha, destroying 187 homes and damaging 117 others (http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=305).

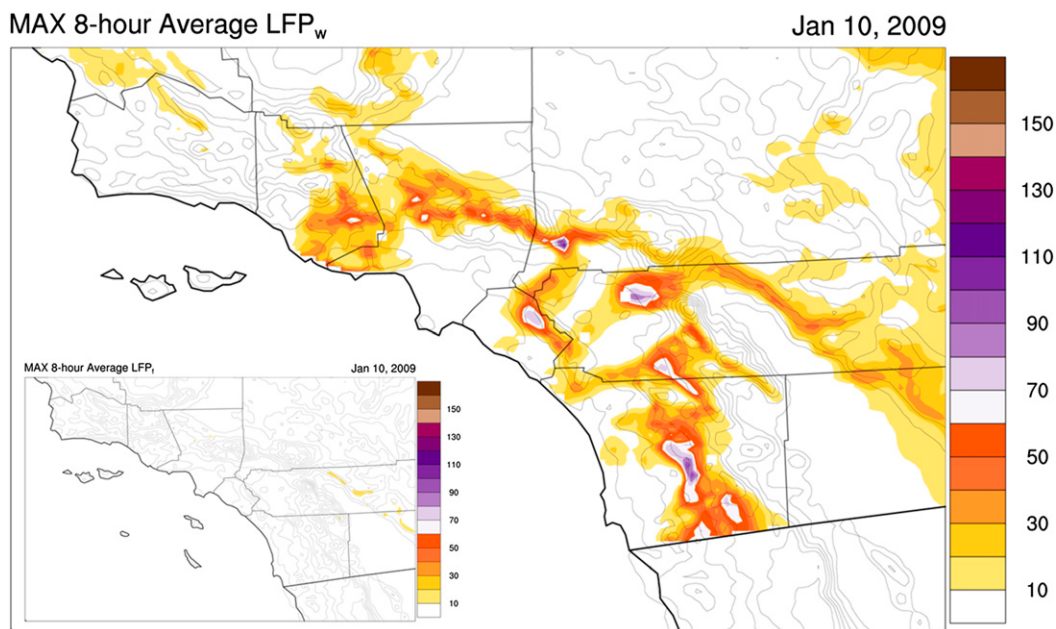


FIG. 8. Average LFP_w and (bottom left) LFP from 0800 to 1500 LST during a Santa Ana event in January 2009.

Mesoscale Forecast System (NAM) 1–3.5-day forecasts to 3-km resolution. We use a two-way-nested WRF domain configuration consisting of a 3-km-resolution innermost domain nested within a 9-km-resolution outermost domain with 51 vertical levels. To extend the forecast out to 6 days, the 0.25°-resolution Global Forecast System (GFS) is downscaled using WRF to 6-km resolution. We use a two-way-nested WRF domain

configuration consisting of a 6-km-resolution innermost domain nested within an 18-km outer domain and a 54-km outermost domain with 46 vertical levels. To help determine bounds and behavior of the SAWTI equations and place forecasts into some historical perspective, we dynamically downscaled the 32-km-resolution North American Regional Reanalysis (NARR; Mesinger et al. 2006) dataset to 3-km resolution using WRF over the

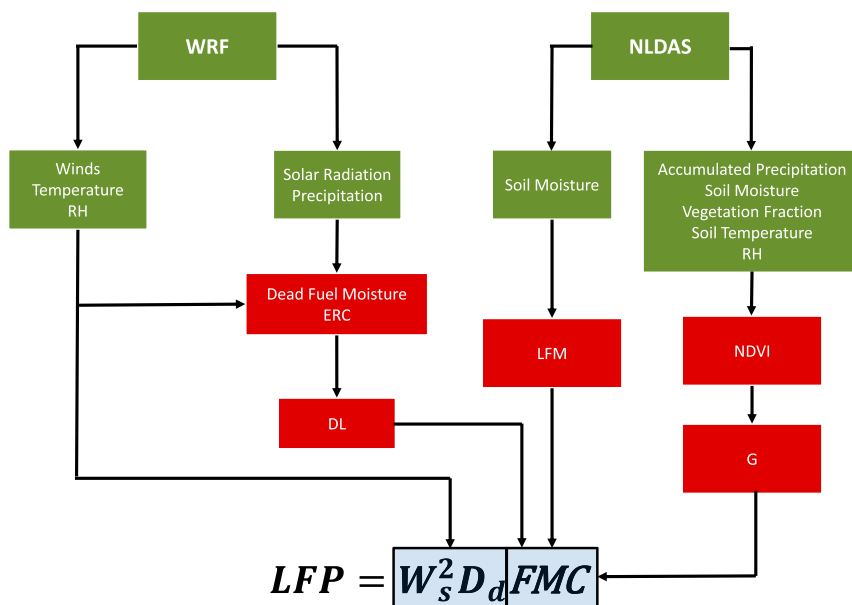


FIG. 9. Flowchart depicting operational LFP input models and datasets, derived variables, and the final LFP equation.

12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
1								2								3							
				4								5											

FIG. 10. Time periods over which LFP_w is averaged.

historical period spanning January 1984–December 2013. We used a two-way-nested WRF domain configuration consisting of a 27-km-resolution outer domain, 9-km-resolution inner domain, and 3-km-resolution innermost domain with 51 vertical levels. WRF was integrated across 3.5-day periods with the first 12 h from each period discarded as spinup time.

b. Calculating SAWTI

1) WEATHER

Equation (1) is temporally averaged at each WRF grid point across the domain using the following equation:

$$LFP_{w,gpx} = \frac{LFP_{w,hour1} + LFP_{w,hour2} + \dots + LFP_{w,hour8}}{8}, \quad (7)$$

where $LFP_{w,gpx}$ is an average LFP_w value over an 8-h time period at grid point x . An 8-h period was chosen because that is ample time for the finer fuels (i.e., DFM_{10hr}) to respond to the ambient atmospheric conditions. Once

an average LFP_w had been calculated for each grid point, the maximum 8-h-average LFP_w for each day is then spatially averaged over each zone as follows:

$$LFP_{w,zone} = \frac{LFP_{wgp1} + LFP_{wgp2} + \dots + LFP_{wgpX}}{\text{Number of grid points per zone}}, \quad (8)$$

where $LFP_{w,zone}$ is the maximum 8-h average at each grid point within the model domain. It is important to note that (7) was calculated for five different eight-consecutive-hour time periods with the highest value chosen to represent each zone for the day (Fig. 10). This is to ensure that the worst conditions are being captured on a daily basis. For instance while most Santa Ana wind events peak during the morning hours, some events can peak later in the day or at night depending on the arrival time of stronger dynamical support. Thus, calculating LFP_w for only one consecutive 8-h time period may fail to capture the worst conditions of the day. This more simplistic approach was favored compared to using an 8-h running average.

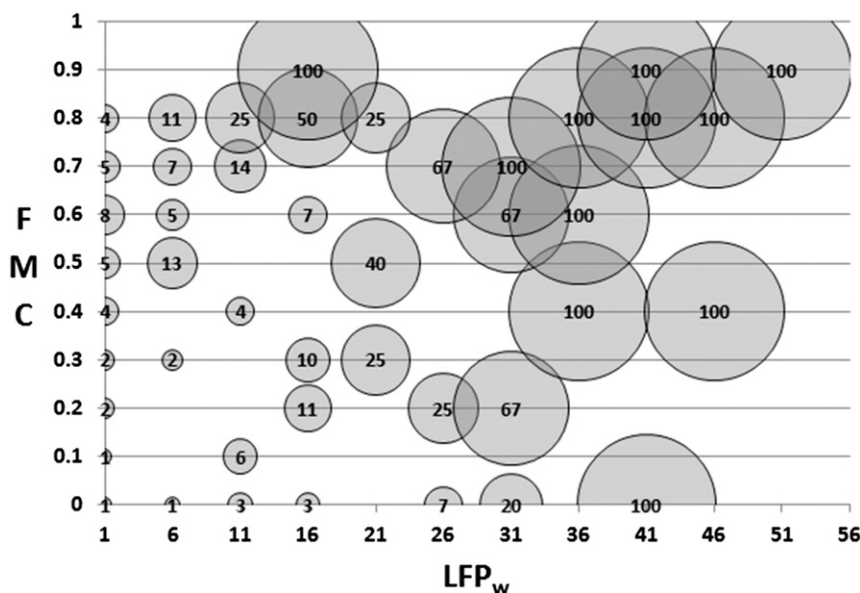


FIG. 11. Using historical fire occurrence data between 1992 and 2011, the relationship between binned FMC, LFP_w , and fire activity for zone 1 is shown. Tick marks indicate starting bin values for both FMC (bin interval of 0.099) and LFP_w (bin interval of 5). Bubble size indicates the conditional probability for an ignition to meet or exceed 100 ha. For instance, 100% of fires that ignited during conditions characterized by $FMC \geq 0.7$ and $LFP_w \geq 36$ grew into large fires.

TABLE 3. Categories of threat levels and their descriptions.

Category	Description
No rating	Santa Ana winds are either not expected or will not contribute to significant fire activity
Marginal	Upon ignition, fires may grow rapidly
Moderate	Upon ignition, fires will grow rapidly and will be difficult to control
High	Upon ignition, fires will grow very rapidly, will burn intensely, and will be very difficult to control
Extreme	Upon ignition, fires will have extreme growth, will burn very intensely, and will be uncontrollable

2) FUELS

Recall that DL relates ERC and DFM to historical fire activity. To provide a DL forecast, DFM and ERC are computed across the spinup WRF forecast period. To avoid the potentially long spinup times required by DFM, the DFM must be initialized at each grid point across the WRF domain. Since a publicly available gridded observed DFM product does not exist, DFM is initialized using the previous day's DFM forecast valid at the fourth hour of the current WRF forecast. The first 4 h of each WRF forecast are removed to allow for model spinup and to avoid contamination of DFM and

ERC as a result of relatively unrealistic atmospheric inputs. Because of the need for these continuously spunup DFM time series, WRF forecasts must be uninterrupted. However, if any WRF forecasts are missed, DFM forecasts could be initialized using output from earlier WRF/DFM forecasts, which are archived for at least a month.

Quasi-observational data (NLDAS-2) are available for estimating LFM and NDVI using (3) and (5), respectively. The 22-day lagged soil moisture required for LFM is provided from the Noah land surface model output of the NLDAS-2 dataset. For NDVI, the latest NLDAS-2 output is used (typically a 5-day lag),

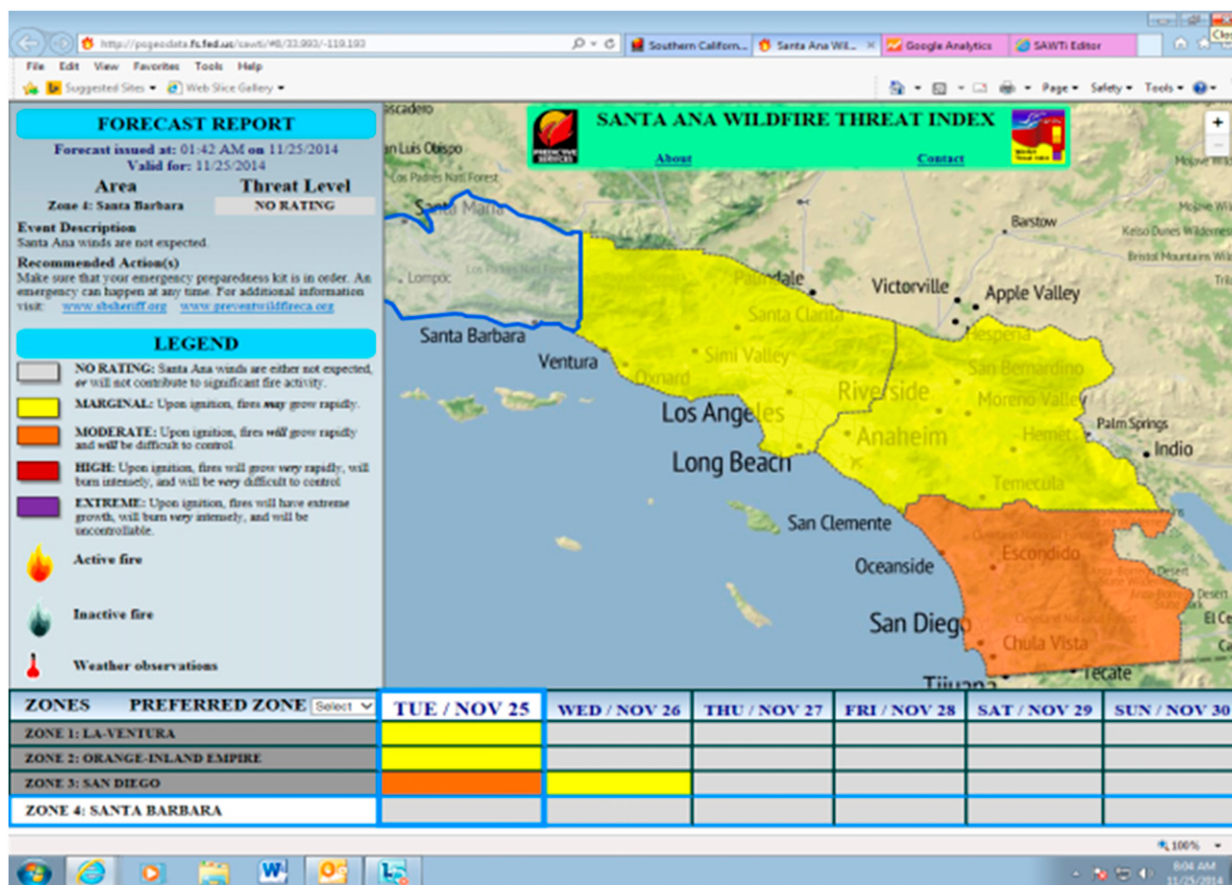


FIG. 12. Online operational SAWTI product.

which provides vegetation fraction, 2-m relative humidity, and soil moisture. Archived NLDAS-2 data are needed going back to the previous 1 September for cumulative precipitation. Both LFM and NDVI are regridded from the NLDAS-2 data at 12.5 km to the 3-km horizontal resolution, matching the WRF domain using bilinear interpolation, and are held constant across the 6-day forecast period. In contrast to weather that is calculated hourly, fuel conditions are calculated only at 1300 LST, representing fuel conditions for the entire day.

c. Public dissemination

Social science was incorporated during the early stages of the developmental process of SAWTI (Wall et al. 2014). The Desert Research Institute provided a social scientist to conduct an in-depth survey of five communities across Southern California. Much of the survey centered on questions regarding how the public obtains weather and fire information and their associated responses to that information. The results of the survey were used to help determine the type of information that would be presented in the product. In conjunction with the social science, historical weather and fuels data were correlated to historical fire occurrence records to develop index threat level categories. For example, for each SAWTI zone we compared daily FMC values along with daily LFP_w values from (1) for the historical period (1992–2011) to whether or not a fire had occurred. We repeated the process; this time equating the output to whether or not a 100-ha fire or greater occurred (Fig. 11). Comparing these two results yielded a conditional probability for an ignition to reach or exceed 100 ha based on FMC and LFP values. By assessing and employing these probabilities, LFP breakpoints could easily be determined (see section 3e for more details).

The SAWTI has four threat levels that range from “marginal” to “extreme.” When Santa Ana winds are either not expected or will not contribute to significant fire activity, then a “no rating” is issued for that day. For example, it could be possible that if a strong Santa Ana wind event were to transpire after appreciable rains occurred or when fuels are wet, the event would be categorized as a no rating. For definitions of other threat levels, see Table 3. Tied to each threat level is a list of recommended actions suggested to the public to better prepare for an impending event. Examples include the following instructions: “Clean debris away from your house, charge your cell phone and make sure you have plenty of gas.” The list of recommended actions expands as the threat levels increase. This aspect of the product is critical, as it serves to link categories of severity with public awareness.

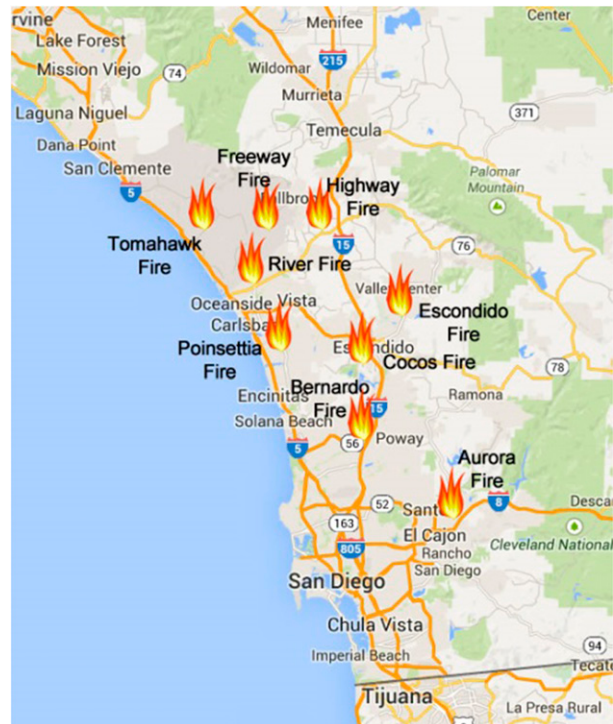


FIG. 13. Map of active fires (icons) on 14 May 2014 across San Diego County.

The product consists of an online web page (<http://sawti.fs.fed.us>) that displays a 6-day forecast of the above-mentioned categories for each of the four zones across Southern California (Fig. 12). A map of the region stands as the centerpiece of the page and graphically shows the categories that are colorized, ranging from gray (no rating) to purple (extreme). The product is issued once daily but can be updated more frequently as conditions warrant. The web page allows users to obtain more information such as viewing the latest weather observation from select stations when zoomed in on the map. The page will also display active and nonactive fires (via icons) on the map when such activity is present. Selecting one of these icons will provide the user with specific fire information such as acreage burned, percent contained, and links to more data. SAWTI also has a Twitter feed (https://twitter.com/sawti_forecast), where users are notified about changes in threat levels.

The product was beta tested for a year prior to it becoming a public product in the fall of 2014. During the beta test phase, the index performed well in capturing all events that occurred during the fall of 2013 through the spring of 2014, which featured events that ranged from no rating to high. Several notable events occurred during this period: 16 January 2014 (Colby fire), 29 April–1 May 2014 (Etiwanda fire), and 13–14 May 2014 (the

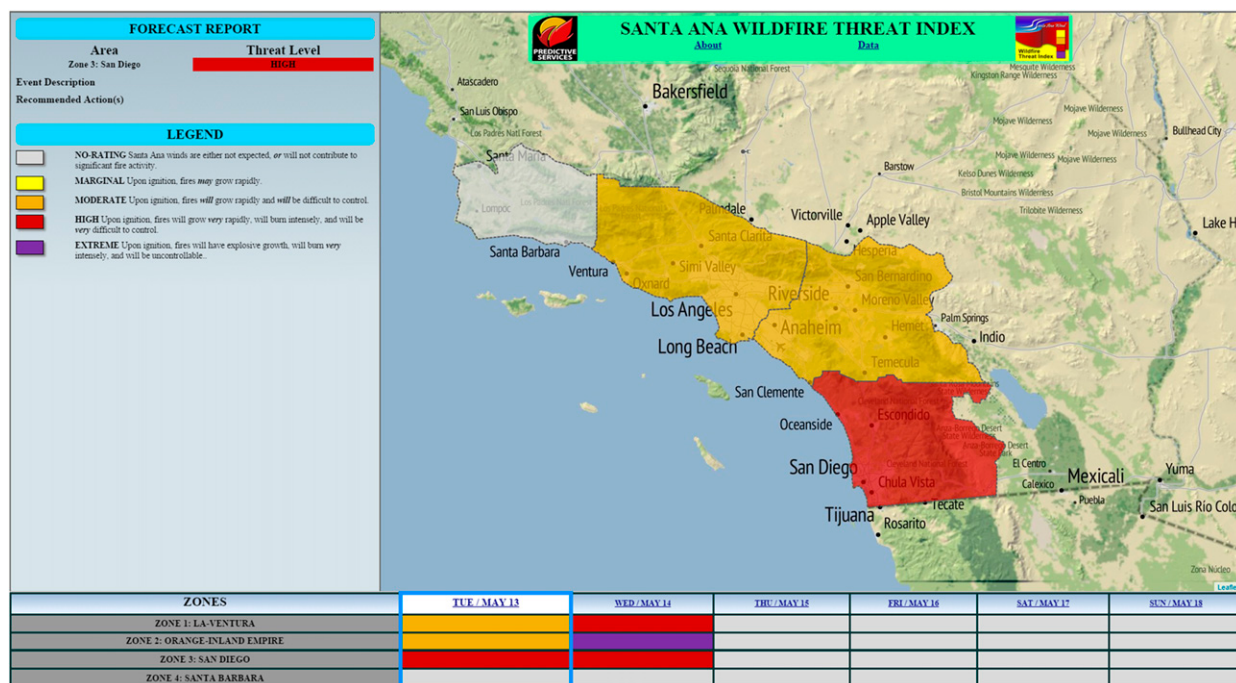


FIG. 14. SAWTI (in beta test) during 14–15 May 2014.

San Diego fires). Fire agencies that were granted access to the index during this time used the product to make critical decisions regarding the allocation and mobilization of shared fire resources prior to when these fires occurred. Specifically, the event that occurred on 13–14 May 2014 was especially notable because of the fact that the winds were unusually strong during this period, and that multiple large fires occurred as a result. Figure 13 shows a map of the fires across San Diego County, while Fig. 14 shows the SAWTI in beta test form for this event. The product was officially released to the public on 17 September 2014 via a press release and at an associated press conference. Since that time, the product has been used by local news media across the San Diego and Los Angeles metropolitan areas, as well as being shown on The Weather Channel.

d. Validation

Fire potential is very difficult to validate since our model is based on a conditional probability (i.e., getting an ignition). In addition, once an ignition occurs there are a number of human behaviors that cannot be predicted that can influence fire potential. For instance, if the SAWTI indicates a high likelihood of having a large fire for a particular Santa Ana wind event and one does not occur, it does not necessarily mean the model performed poorly. There may not have been an ignition during the event, or there may have been an ignition, but

adequate fire-fighting resources were made available to be successful in suppressing the incident before the fire became large. There have been a few times where the index displayed a no rating and a large fire occurred, but this has been very rare.

Modeling fuel conditions accurately presents certain challenges. Regarding DFM, our ability to validate WRF DFM and ERC is limited given the sparse observations across this domain. Various Remote Automated Weather Stations (RAWSSs) calculate DFM using measured atmospheric inputs including near-surface temperature, relative humidity, precipitation, and solar radiation. We validate WRF DFM and ERC across two years of the 30-yr historical period at 14 RAWSSs (Fig. 15). These stations were selected so that at least three stations represent zones 1–3. Zone 4 has relatively fewer RAWSSs reporting DFM and ERC measurements for the time period of interest; thus, only one station represents zone 4. At each RAWSS location, the closest WRF grid cell with the smallest elevation difference was selected for validation. We show two example time series plots (Figs. 16 and 17), for the Goose Valley and Claremont RAWSSs. At the Goose Valley RAWSS site (Fig. 16), the WRF DFM and ERC output agrees well with RAWSS measurements for most of the two years examined, with only slightly positive biases of 0.24 and 2.14 for DFM_{100hr} and DFM_{1000hr}, respectively. At the Claremont RAWSS (Fig. 17), the WRF DFM and ERC

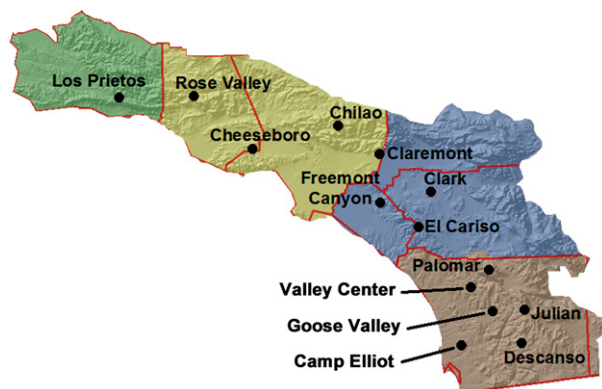


FIG. 15. RAWs used to validate WRF DFM and ERC.

output compares less favorably at certain times over the two years and more strongly during others. However, we report small biases at the Claremont RAWs of -1.27 and 1.30 for DFM_{100hr} and DFM_{1000hr} , respectively, with RMSEs of 4.22 and 2.65 . Table 4 shows WRF error statistics for all 14 RAWs across the 2-yr period. The WRF DFM_{100hr} bias ranges from -1.27 to 4.00 , while RMSE ranges from 2.72 to 4.93 , with the correlation

ranging from 0.55 to 0.86 . Our WRF DFM_{1000hr} has a positive bias ranging from 1.30 to 6.00 , with RMSE spanning 2.50 – 6.15 , and the correlation from 0.54 to 0.92 . Finally, the WRF ERC bias is mostly negative given the positive DFM_{1000hr} bias ranging from -25.09 to 0.50 , with RMSE ranging from 9.52 to 27.41 , and the correlation from 0.53 to 0.90 . It is hypothesized that WRF does not adequately resolve the complex topography at the two RAWs that have the worst error statistics: Chilao and Palomar.

e. Climatology

The historical dataset described previously provides us with an unprecedented 30-yr climatology of the fuel and weather variables related to wildfires across the four SAWTI zones in Southern California. Having this dataset has allowed us first to create breakpoints within the raw SAWTI output necessary for the development of the four threat levels that are integral to the final public product. To do this, we correlated historical fire occurrence data with historical LFP values from the dataset to develop breakpoints for the SAWTI. Most of the breakpoints fell naturally, but with some minor

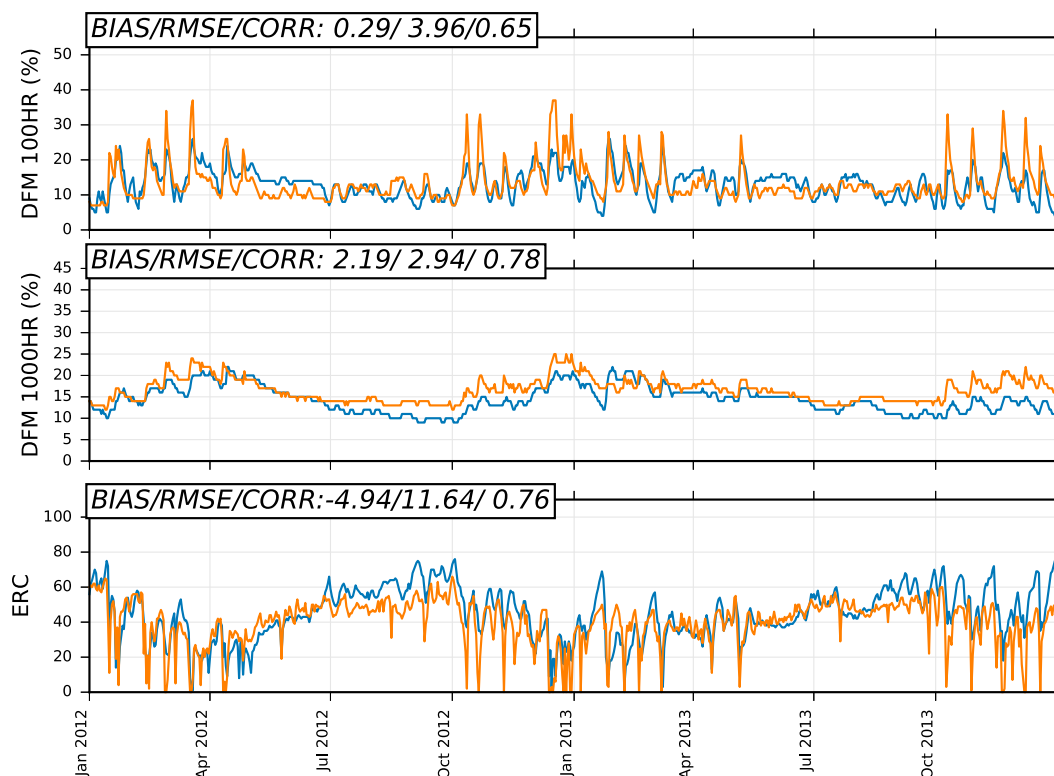


FIG. 16. RAWs (blue line) and closest WRF grid cell (orange line) time series of (top) 100- and (middle) 1000-h dead fuel moisture, and (bottom) ERC spanning January–December 2012–December 2013 for Goose Valley. WRF output coincides with RAWs 1300 LST measurements. Each plot is annotated with WRF output bias, RMSE, and the Spearman correlation.

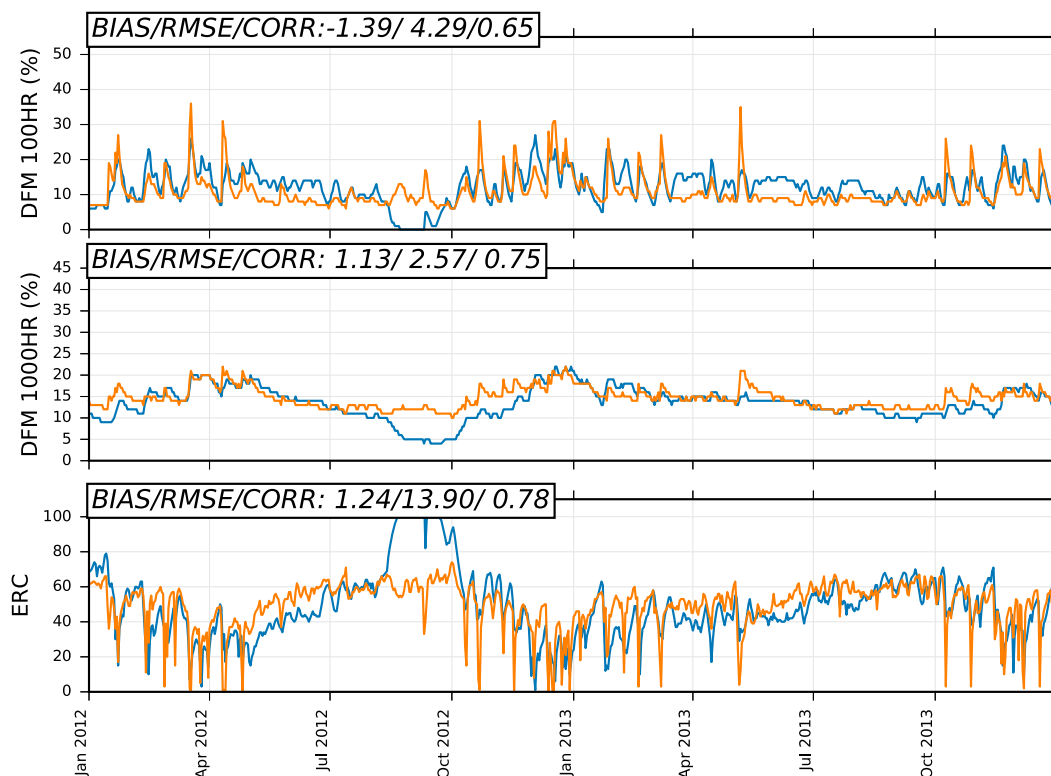


FIG. 17. As in Fig. 16, but for the Claremont RAWS.

adjustments, we created breakpoints at the 50th, 75th, 90th, and 97th percentiles. Significant increases in conditional probabilities for each category seemed to confirm our choices.

This unique dataset informs us about the historical significance the fuels, weather, and SAWTI events have had during the past 30 years. Having the ability to put past, but perhaps more importantly, forecasted SAWTI events into historical perspective helps inform the

public and first responders about the nature and the characteristics of an impending event. For example, we can authoritatively state that the Santa Ana wind event that helped to spawn the Witch Creek fire (and served as the catalyst for the development of this index) was ranked as the highest event in the 30-yr dataset for zones 1 and 2.

As we continue to explore this dataset, we hope to gain a better understanding of the climatology of Santa

TABLE 4. WRF error statistics at each RAWS for time spanning January 2012–December 2013.

Station	100-h DFM			1000-h DFM			ERC		
	Bias	RMSE	Correlation	Bias	RMSE	Correlation	Bias	RMSE	Correlation
Camp Elliot	0.17	3.90	0.55	1.75	2.97	0.54	−0.71	11.12	0.53
Cheeseboro	0.99	3.30	0.69	3.89	4.25	0.75	−10.78	14.81	0.74
Chilao	4.00	4.93	0.84	6.00	6.15	0.92	−25.09	27.41	0.89
Claremont	−1.27	4.22	0.66	1.30	2.65	0.76	0.50	13.71	0.79
Clark	−0.06	3.24	0.69	2.80	3.39	0.75	−4.27	11.24	0.76
Descanso	2.45	4.07	0.82	3.93	4.40	0.85	−14.40	18.39	0.84
El Cariso	1.26	3.70	0.73	3.27	3.94	0.81	−9.19	15.02	0.82
Fremont Canyon	−0.03	3.73	0.66	2.21	3.13	0.63	−2.52	11.25	0.73
Goose Valley	0.24	3.96	0.65	2.14	2.90	0.78	−4.82	11.50	0.77
Julian	0.95	3.97	0.80	2.36	3.05	0.90	−4.81	10.54	0.90
Los Prietos	−0.97	2.72	0.74	1.69	2.67	0.72	−3.27	10.45	0.72
Palomar	3.06	4.46	0.86	4.12	4.82	0.88	−14.72	20.12	0.88
Rose Valley	0.74	2.83	0.77	3.06	3.45	0.85	−10.06	14.06	0.82
Valley Center	−0.22	3.80	0.67	1.84	2.50	0.80	−2.32	9.52	0.78

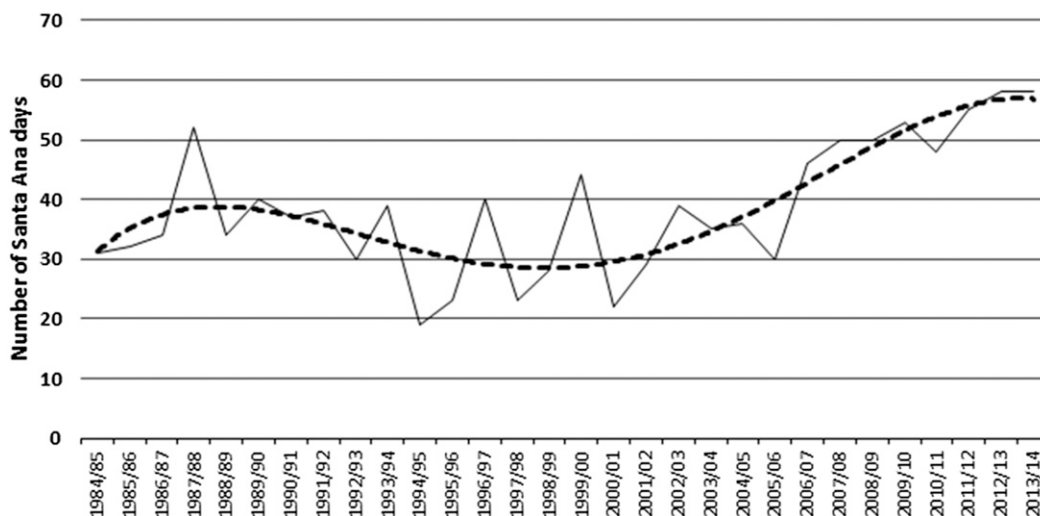


FIG. 18. Number of Santa Ana wind days per rain year (1 Jul–30 Jun) for years spanning 1984–2014 (solid black line). Dashed line is a polynomial fit to the data, which helps to depict the longer time period trends.

Ana winds during the past three decades, including detecting and understanding interannual trends and cycles in event frequencies and strength. Figure 18 shows the number of days when Santa Ana winds occurred across zone 3 for the period spanning 1984–2013. This figure reveals a noticeable upward trend in the frequency of Santa Ana wind days during approximately the last 10 years, ending in 2013. Preliminary research shows that this long-term trend in frequency (possibly associated with a longer-term interannual cycle) coincides with a predominately negative phase of the Pacific decadal oscillation (PDO). Further investigation conducted in a future paper will seek to explore the causal mechanisms for this trend in frequency, as well as other trends in Santa Ana wind characteristics.

4. Summary and conclusions

As the wildland–urban interface (WUI) continues to expand across Southern California, the sources of ignition will increase, leading to a greater probability for large and destructive fires during Santa Ana wind events. This puts the public and firefighter safety at risk, thus the increasing need to categorize such events in terms of their effect on the fire environment.

Predictive Services' initial efforts to categorize Santa Ana winds helped to provide the leadership and guidance necessary for the development of the SAWTI. Through the successful collaboration between the government, academia, and the private sector, high-resolution model data along with satellite-derived variables allowed us to incorporate fuel and weather data into the index on a gridded domain within Southern California. Challenges

surrounding the assessment of fuel conditions include the difficulty in determining different fuel moisture parameters, which can sometimes result in a less accurate evaluation of fuel conditions. Further refinement of the model is needed to improve the overall output. However, during the beta testing process, the index performed very well with positive responses from the recipients of the preliminary output. Since its public unveiling, the index has been well received by the media and the fire community.

Our 30-yr dataset is unprecedented. Not only does it provide us with 30 years' worth of fuel moisture data across Southern California (which is useful in relating fuel conditions with drought), it also gives us quantifiable outputs of average wind velocity, dewpoint depression, and the SAWTI itself. This allows us to put past and future Santa Ana events (magnitude, duration, and spatial coverage) into historical perspective, which is significant. Future studies in the climatology of such events can be conducted, leading to a better understanding of why certain trends exist.

Fire agencies and first responders, private industry, the general public, and the media now have a new operational tool that determines the severity of Santa Ana wind events. Furthermore, they will have a clearer understanding of the severity of an event based on the potential for large fires to occur. Specifically, a more effective media response will result in the general population (particularly those living within the WUI) being more proactive in its response to an impending event.

Acknowledgments. The authors thank Dr. Jim Means for his helpful suggestions and input into this project.

We also appreciate the advice from Beth Hall, Tamara Wall, Mark Jackson, and Alex Tardy. The data used in this study were acquired as part of the mission of NASA's Earth Science Division and archived and distributed by the Goddard Earth Sciences (GES) Data and Information Services Center (DISC). Major funding for this project was provided by SDG&E.

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“NWS San Diego Briefing - October 29, 2019 (2)”



Weather Decision Support Services

National Weather Service - San Diego

Issued: 550 PM Tuesday, October 29, 2019

Next Update: Wednesday afternoon

Point of Contact: NWS Operations (24/7/365) (858) 675-8705

KEY POINTS

- Strong Santa Ana event remains on track for tonight through Thursday, with critical to locally extreme fire weather conditions expected.
- Sub-freezing temperatures across mountains and High Desert Wednesday through Friday.
- Small Craft Advisory in effect 3 AM Wednesday to 1 AM Thursday for offshore winds gusting to 25 kts.

CHANGES SINCE LAST BRIEFING

- Fire weather threat for Wednesday increased to extreme.
- New YouTube briefing available:
<https://www.youtube.com/watch?v=ktL3QO1HAIE>
- Otherwise, no changes to previous briefing.

WEATHER AND IMPACTS OUTLOOK



Threat Matrix



Weather Threat	Tue 10/29	Wed 10/30	Thu 10/31	Fri 11/01	Sat 11/02	Sun 11/03	Mon 11/04	Tue 11/05
Urban Rain (Driving Impact)								
Flooding								
Thunderstorms								
Snow								
Non-Thunderstorm Winds								
Fire Weather								
Extreme Temperatures								
Fog								
Coastal								
Marine								
Impact Scale								

To view the latest hazard threat table:

<https://www.wrh.noaa.gov/sgx/event/dstable.php>

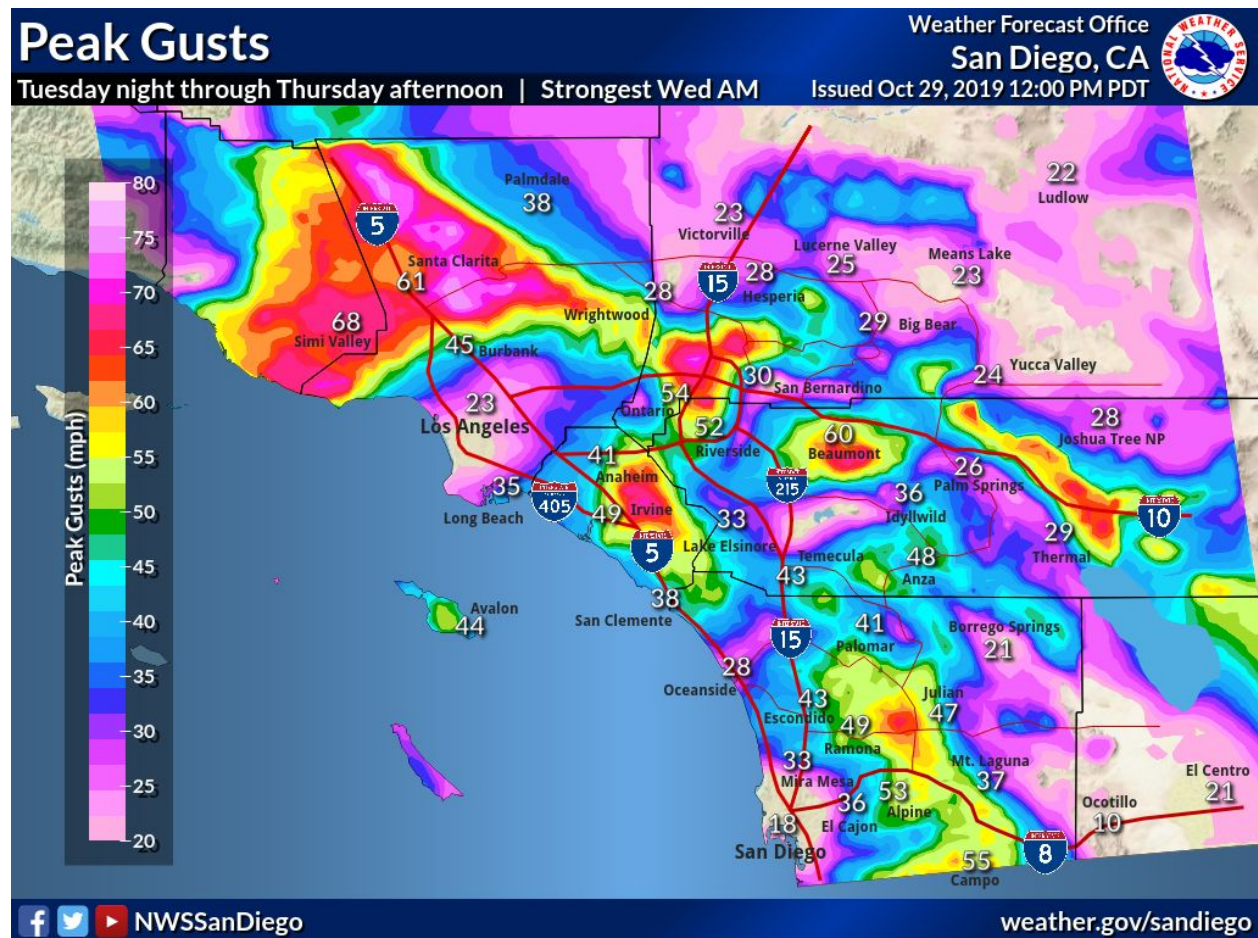
CONFIDENCE AND DETAILS

Strong Santa Ana Winds - Critical Fire Weather Conditions	
High Confidence	Strong Santa Ana winds and critical to extreme fire weather conditions.
Details	- What: ● Red Flag Warning: <i>Strongest Santa Ana wind event of the season</i> will bring critical to extreme fire weather conditions. <i>Single-digit humidity</i> will extend almost to the coast through the duration of the event. Low humidity persisting through Sunday, but with weaker winds. ● High Wind Warning: Strong, locally damaging east to northeast winds 25-35 MPH, gusting to 55 MPH. Isolated gusts 70 to 80 MPH in wind-prone locations. - Where: ● <i>All mountain and inland valley zones</i> of San Bernardino, Riverside and San Diego Counties, as well as the Santa Ana Mountains and inland Orange County. In addition, Red Flag conditions in coastal Orange County on Wednesday. ● Areas of most concern (strongest winds): ○ Downwind slopes of San Bernardino County ○ Through Cajon and San Gorgonio passes, and into adjacent valley areas of the Inland Empire ○ Foothills/canyons of Santa Ana Mountains ○ Foothills/canyons of San Diego County Mountains - When: ● <i>Peak winds occurring Wednesday morning</i> ● Red Flag Warning and High Wind Warning in effect 11 PM Tuesday through 6 PM Thursday. Red Flag Warning for Orange County Coast 5 AM - 11 PM Wednesday.

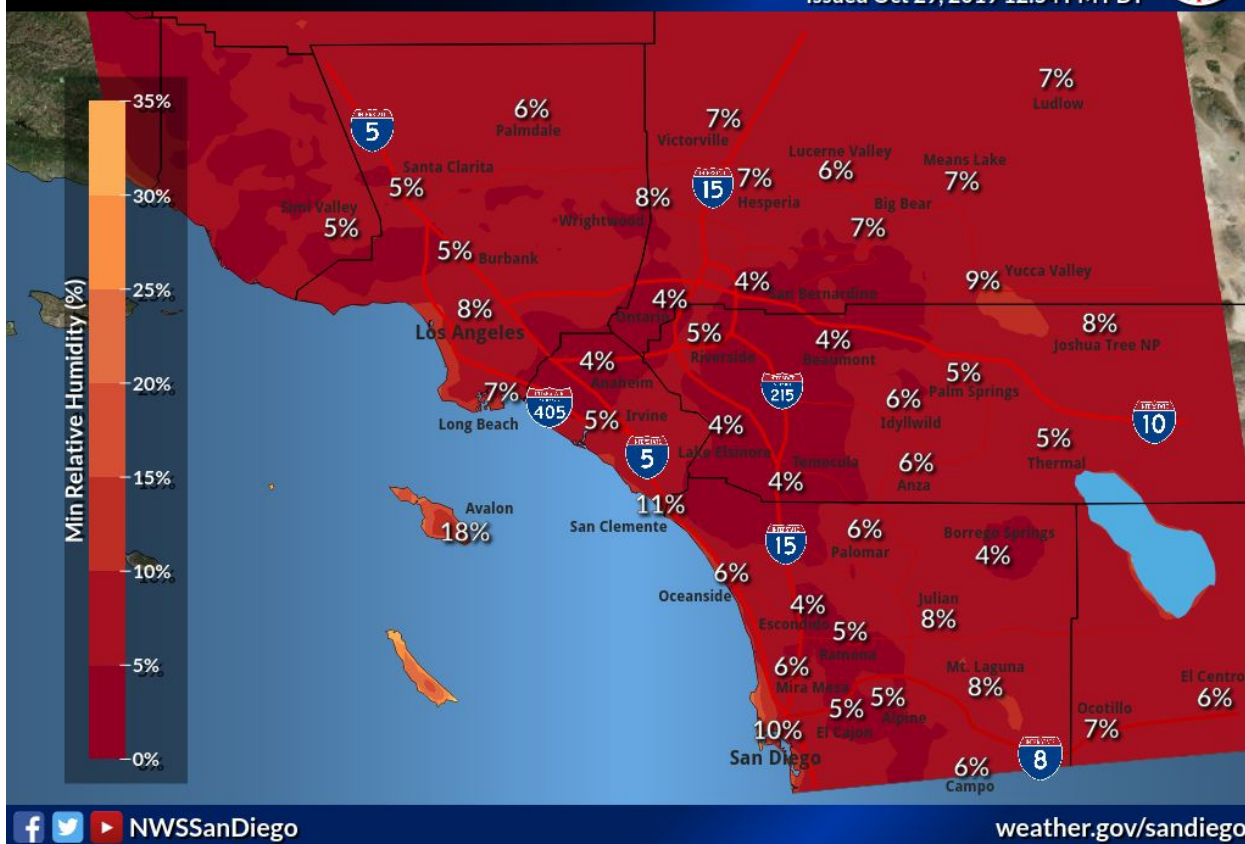
Widespread Freeze in the High Desert

High Confidence	First widespread sub-freezing temperatures in the High Desert.
Details	- What: • Freeze Warning ○ Low temperatures in the low to mid 20's Thursday, mid 20's to low 30's Wednesday and Friday. - Where: High Desert - When: 1 AM Wednesday through 10 AM Friday, coldest Thursday AM.

FORECAST GRAPHICS



Weather Forecast Office
San Diego, CA
Issued Oct 29, 2019 12:54 PM PDT



Low Temperatures Thursday

Low to mid 20's in the High Desert

Weather Forecast Office

San Diego, CA

Issued Oct 29, 2019 12:26 PM PDT



For the latest forecast updates, visit weather.gov/SanDiego

If you have questions or would like to submit weather reports or photos reply to

sgx.forecasters@noaa.gov

or to **subscribe or unsubscribe** from these briefings, email alexander.tardy@noaa.gov

Meteorologist Bruno Rodriguez

NWSSanDiegoBriefing_10October2019



Weather Decision Support Services

National Weather Service - San Diego

Issued: 12:00 PM, October 10, 2019

Next Update: By 2 PM October 11

Point of Contact: NWS Operations (24/7/365) (858) 675-8705

KEY POINTS

- Critical fire weather conditions through Friday with locally strong northeast to east winds and extremely low humidity
- Temperatures in the 30s for the San Bernardinos and high deserts tonight with even a freeze for the greater Big Bear area Friday morning

CHANGES FROM PREVIOUS BRIEFING

- No significant changes

WEATHER AND IMPACTS OUTLOOK

Weather Threat	Thu 10/10	Fri 10/11	Sat 10/12	Sun 10/13	Mon 10/14	Tue 10/15	Wed 10/16	Thu 10/17
Urban Rain (Driving Impact)								
Flooding								
Thunderstorms								
Snow								
Non-Thunderstorm Winds								
Fire Weather								
Extreme Temperatures								
Fog								
Coastal								
Marine								
Impact Scale	None	Minor	Moderate	Major	Extreme			

To view the latest hazard threat table:

<https://www.wrh.noaa.gov/sgx/event/dsstable.php>

Critical Fire Weather - Mountains, Valleys, Orange County, Coachella Valley

High Confidence	Moderate to strong east to northeast winds and extremely low humidity
Details	- What: East to northeast winds of 20-30 mph with gusts to 50 mph and isolated gusts to 70 mph combined with extremely low humidity will create <i>critical fire weather conditions</i>. Daytime humidity will be 5-10% with poor overnight recovery, especially in the wind prone areas. Winds weaken substantially on Saturday, but very dry conditions will continue through the weekend. - Where: Mountains, Valleys, Orange County, and Coachella Valley. Strongest winds in below the Cajon and San Geronio passes and northern portions of the Santa Ana Mountains. - When: Now through Friday afternoon. Winds peak tonight through Friday in San Diego County.

Cold Temperatures - San Bernardinos and High Deserts

Moderate Confidence	Low temperatures in the 30s
Details	- What: Low temperatures in the 30s with temperatures near freezing and just below for the greater Big Bear area. Lows in the high desert will be mostly in the mid to upper 30s. - Where: The San Bernardinos and the high deserts. - When: Friday morning

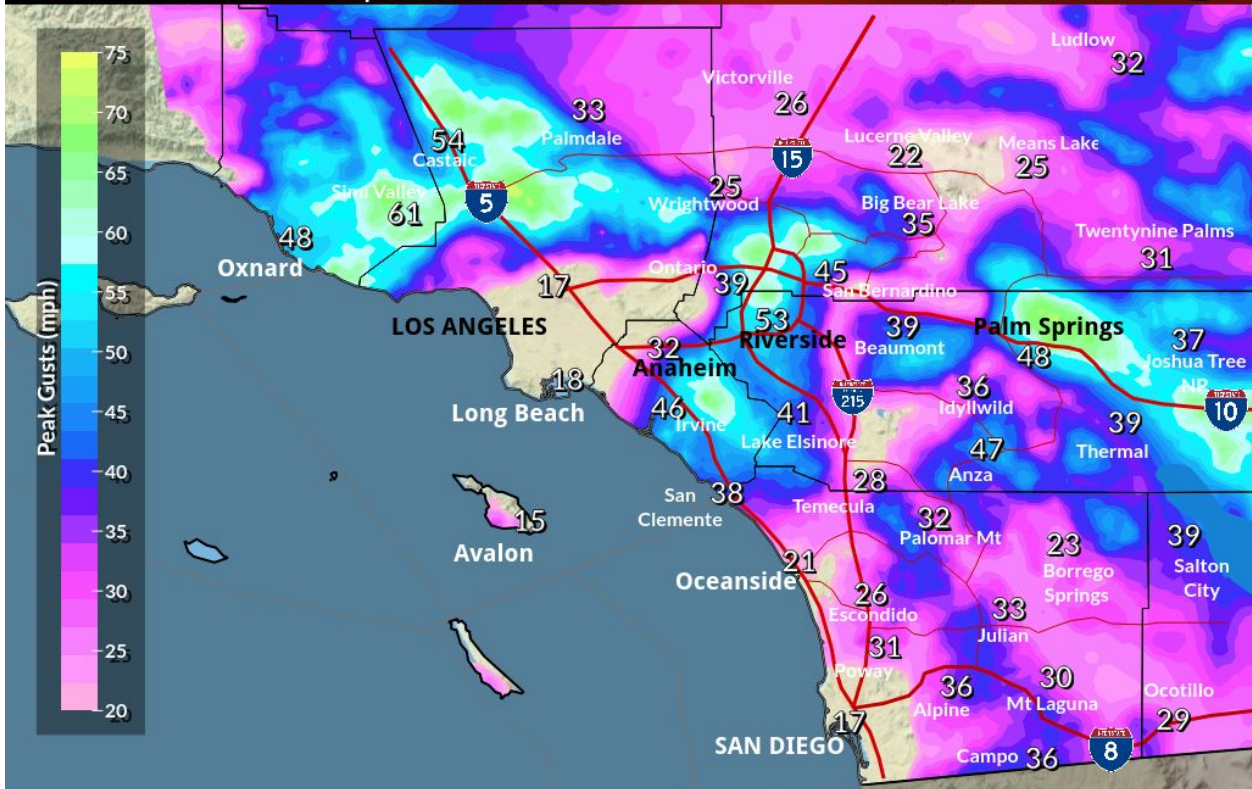
Highest wind gusts Today

Santa Ana winds increase and spread across Socal

Weather Forecast Office

San Diego, CA

Issued Oct 10, 2019 9:50 AM PDT



NWSSanDiego

weather.gov/sandiego

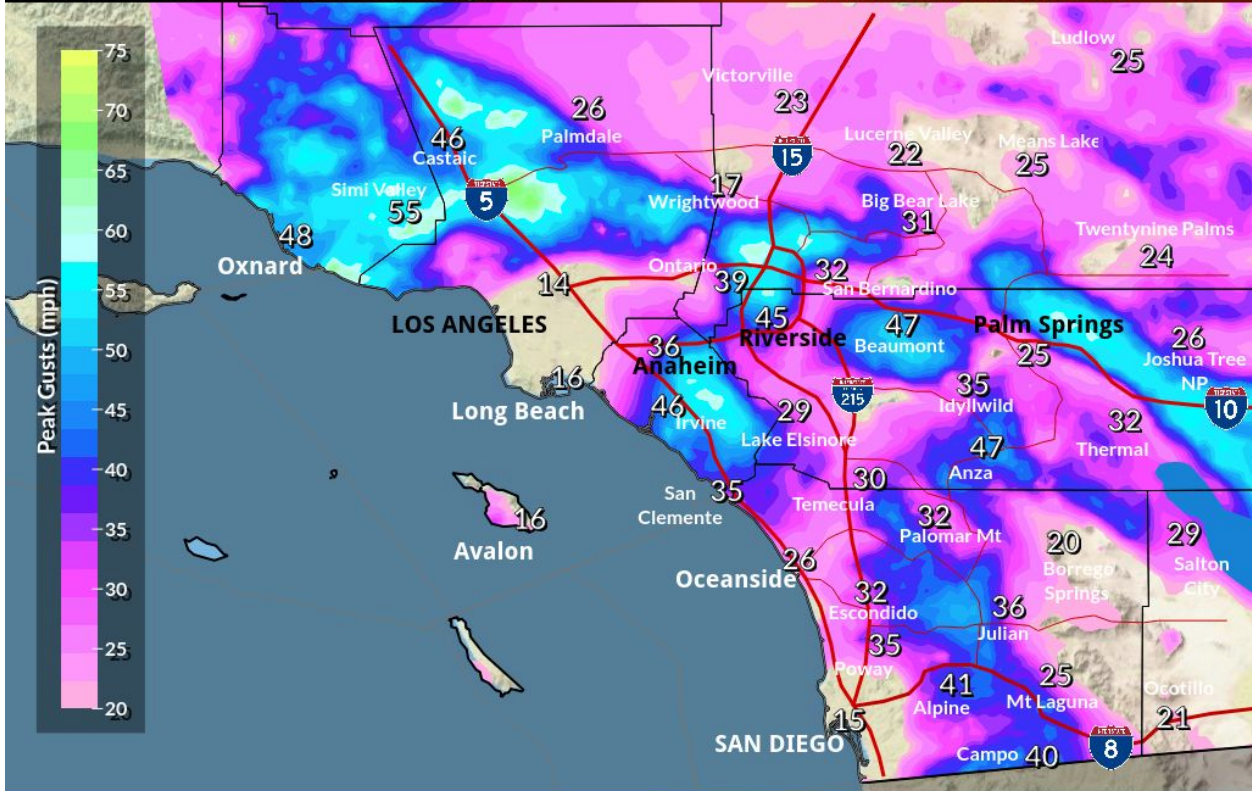
Highest wind gusts on Friday

Santa Ana winds continue and are widespread

Weather Forecast Office

San Diego, CA

Issued Oct 10, 2019 9:49 AM PDT



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weather.gov/sandiego

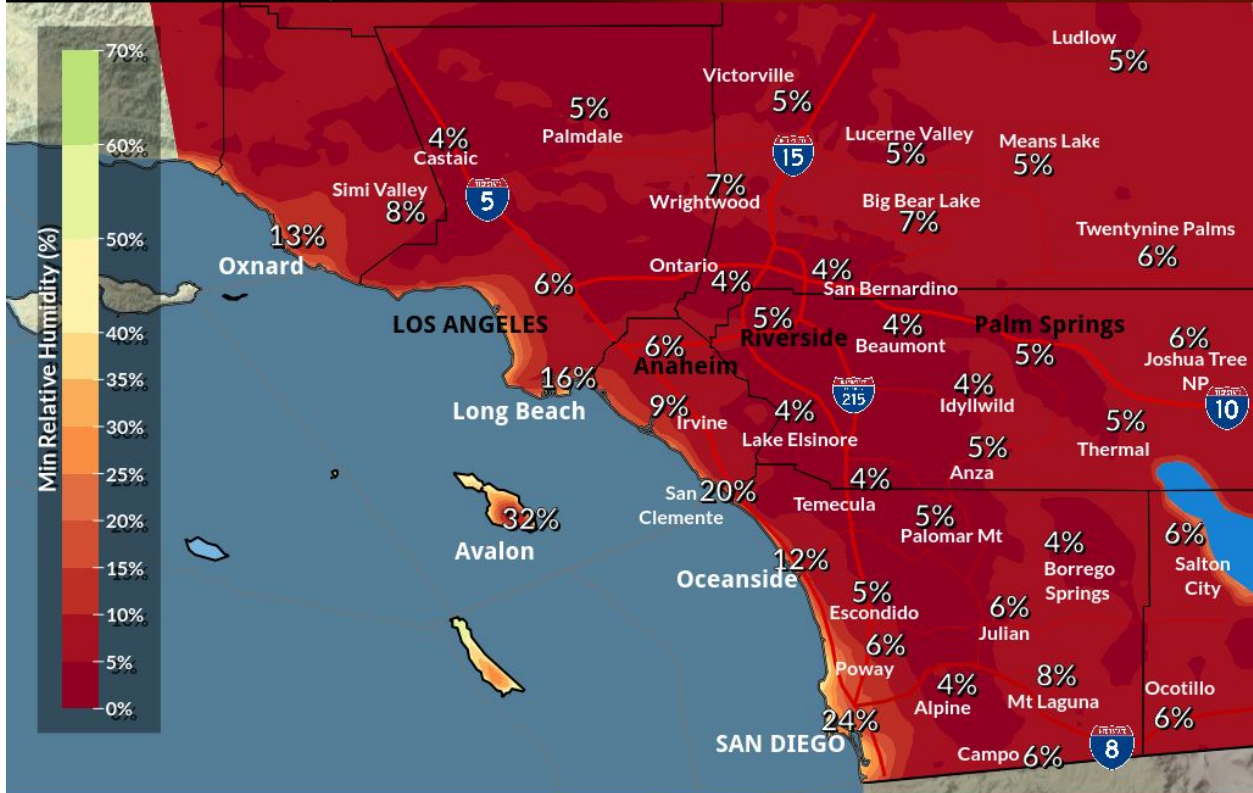
Very dry air develops Today

Santa Ana winds usher in dry air mass

Weather Forecast Office

San Diego, CA

Issued Oct 10, 2019 9:47 AM PDT



NWSSanDiego

weather.gov/sandiego

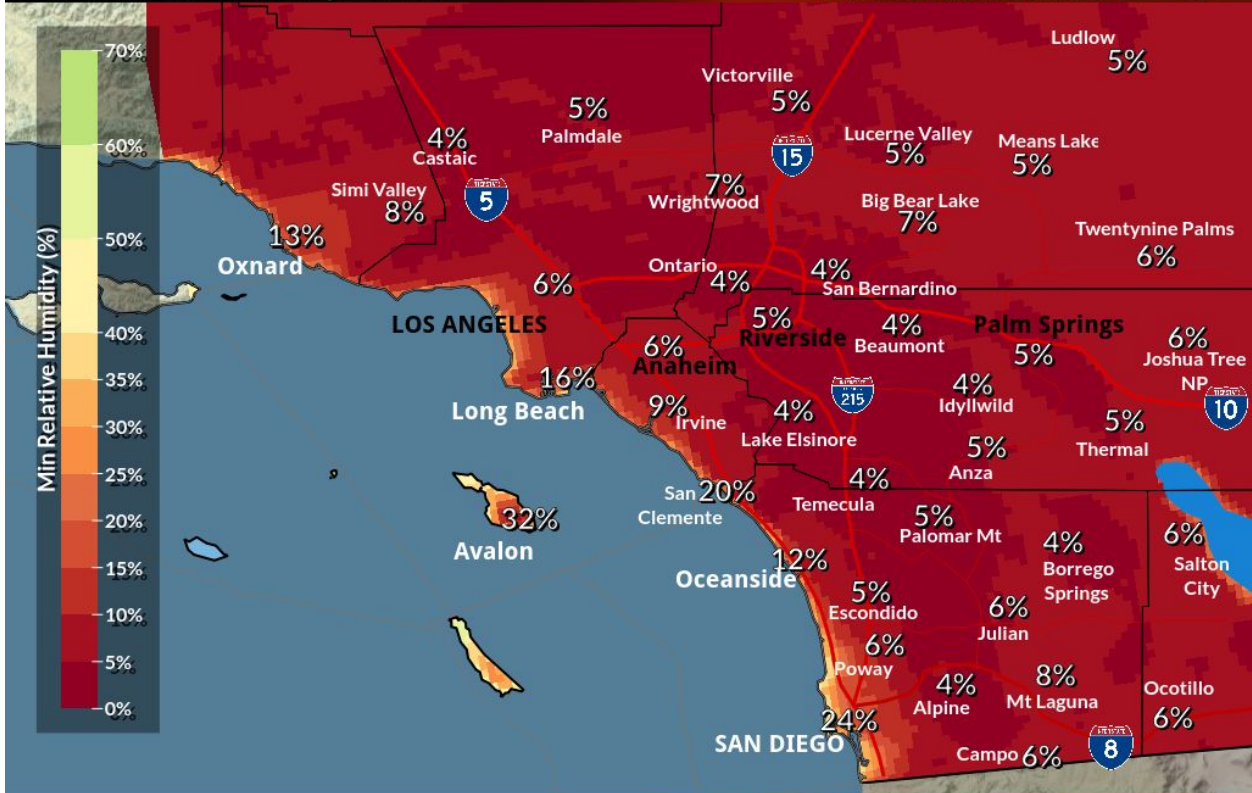
Very dry air on Friday

Santa Ana winds usher in dry air mass

Weather Forecast Office

San Diego, CA

Issued Oct 10, 2019 9:47 AM PDT



NWSSanDiego

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High Temperatures Today

Cooler air arrives with Santa Ana wind

Weather Forecast Office

San Diego, CA

Issued Oct 10, 2019 9:53 AM PDT



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weather.gov/sandiego

Low temperatures on Friday

Dry air brings cool overnight lows

Weather Forecast Office

San Diego, CA

Issued Oct 10, 2019 10:00 AM PDT



NWSSanDiego

weather.gov/sandiego

High Temperatures on Friday

Coast warms on Friday

Weather Forecast Office

San Diego, CA

Issued Oct 10, 2019 9:54 AM PDT



For the latest forecast updates, visit weather.gov/SanDiego

If you have questions or would like to submit weather reports or photos reply to sgx.forecasters@noaa.gov
or to **subscribe** or **unsubscribe** from these briefings, email alexander.tardy@noaa.gov

Meteorologist Dan Gregoria

Santa Ana winds Oct. 24 slides



Fire Danger



Santa Ana winds October 24-28, 2019



Weather Briefing

Alex Tardy- NWS San Diego

Issued October 24, 2019

Webinar #3



Building a Weather-Ready Nation



Highlights

Up Front

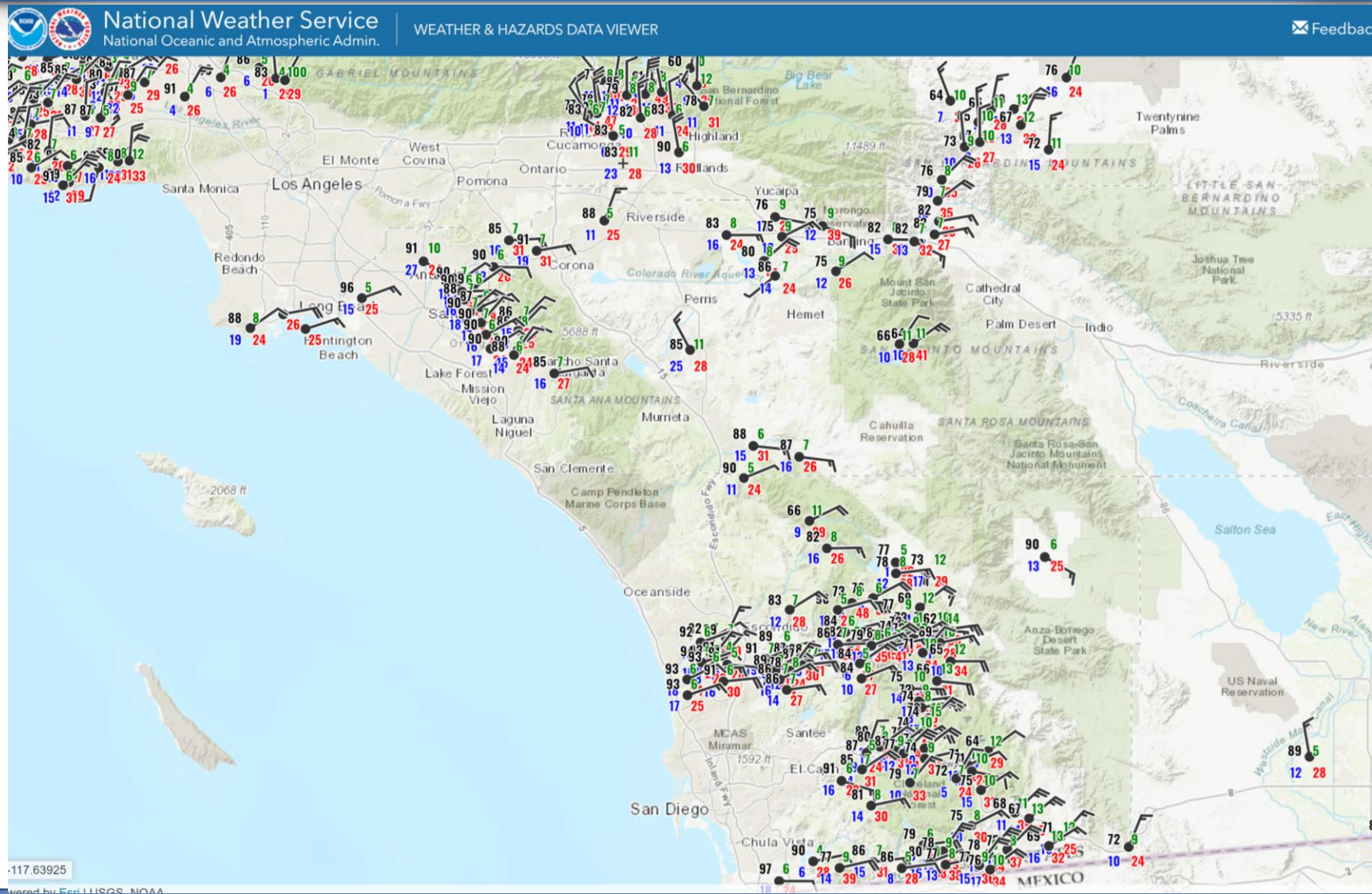


- ❑ Red Flag Warning – High Wind Warning – Heat Advisory
- ❑ Santa Ana wind (strongest tonight and Friday morning)
- ❑ Very warm and very dry air
- ❑ Extended period of dry Santa Ana wind (offshore flow) into early next week
- ❑ Cooler Santa Ana on Sunday and Monday (strongest Monday) – October 27-28 (change in forecast)
- ❑ Warm and dry conditions through early November





Wind today (now)



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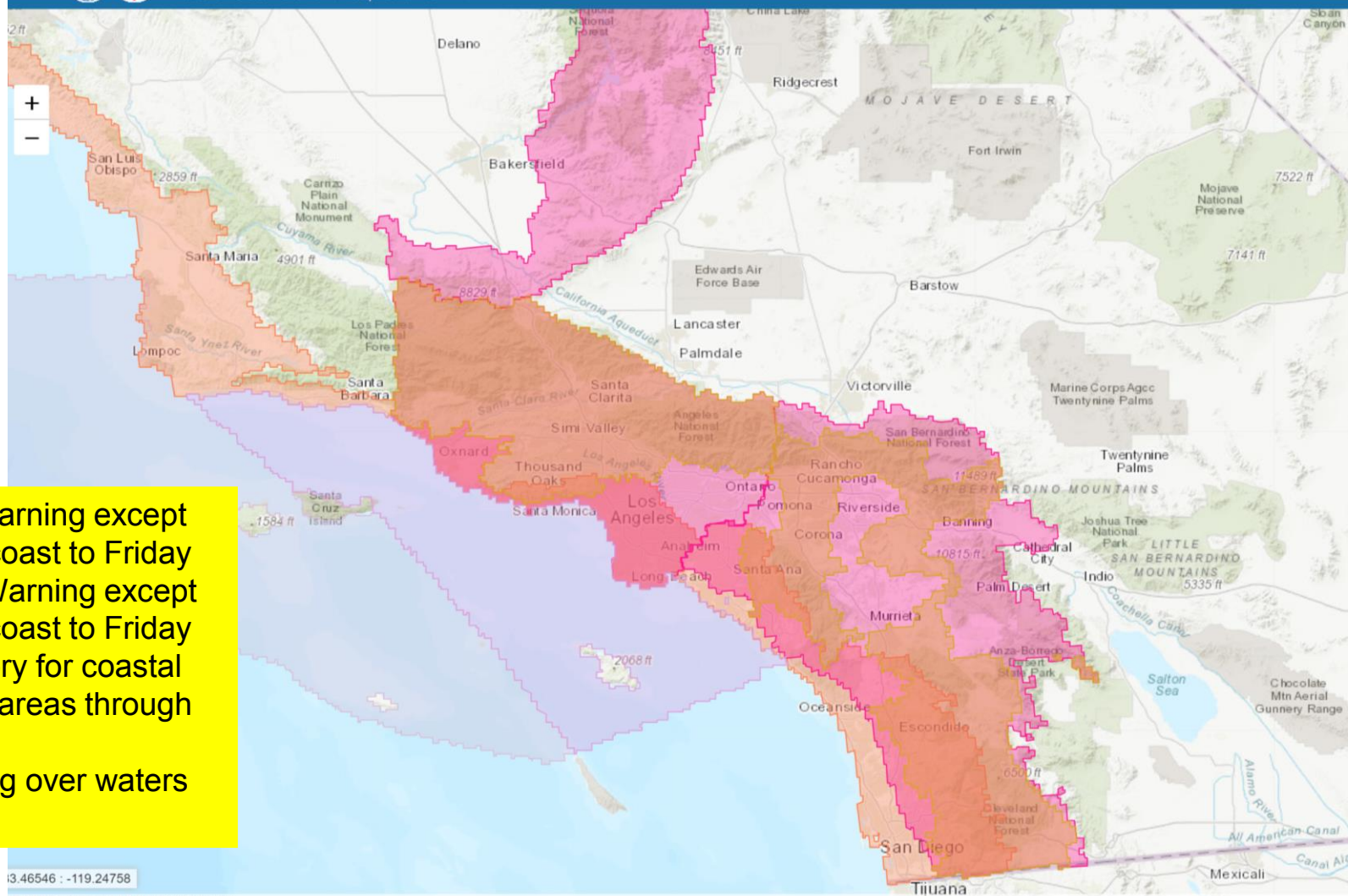
Hazards in Effect now

Weather.Gov



National Weather Service
National Oceanic and Atmospheric Admin.

WEATHER & HAZARDS DATA VIEWER



- Red Flag Warning except immediate coast to Friday
- High wind Warning except immediate coast to Friday
- Heat Advisory for coastal and valleys areas through Friday
- Gale warning over waters west of LA

3.46546, -119.24758

Leaflet | Powered by Esri | USGS, NOAA



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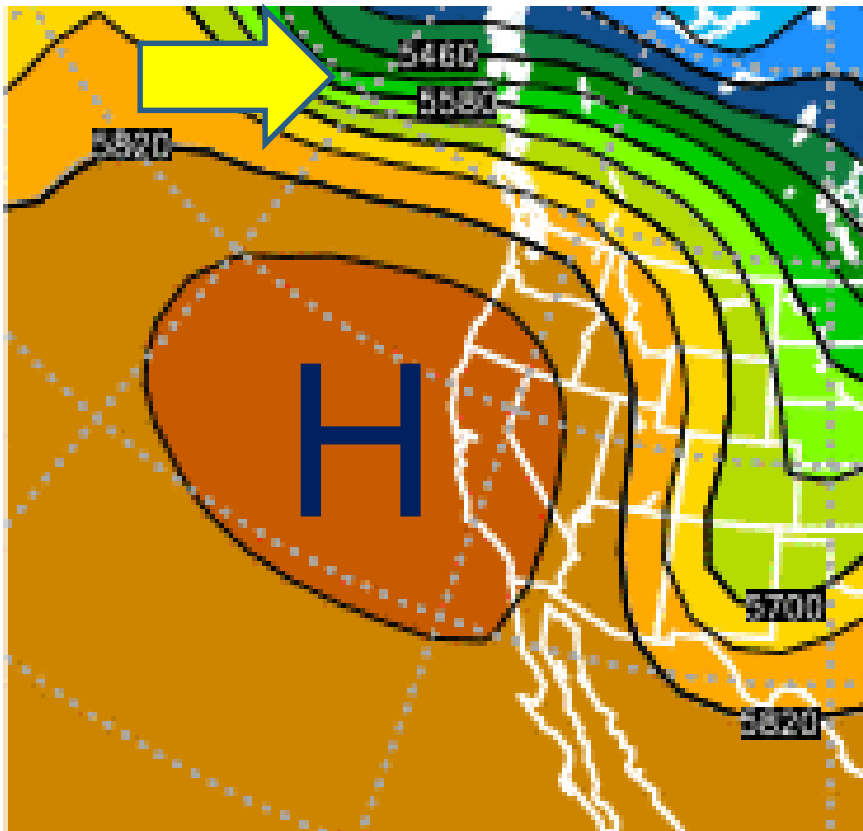


Santa Ana and more to come

Cold air (high pressure) behind a Great Basin storm

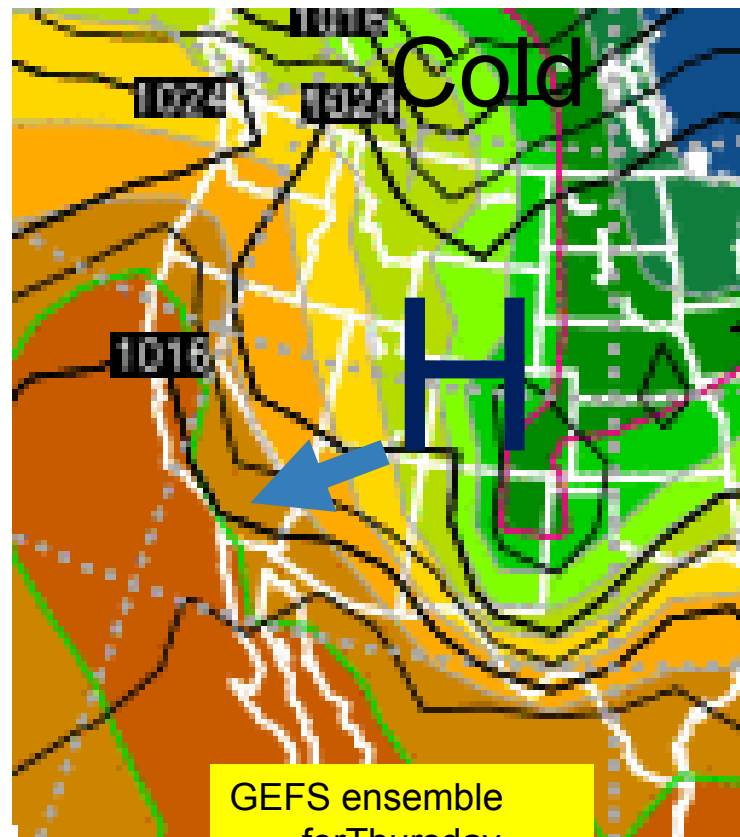


Jet stream



Wind blows dry air offshore

Thursday - Friday weather pattern



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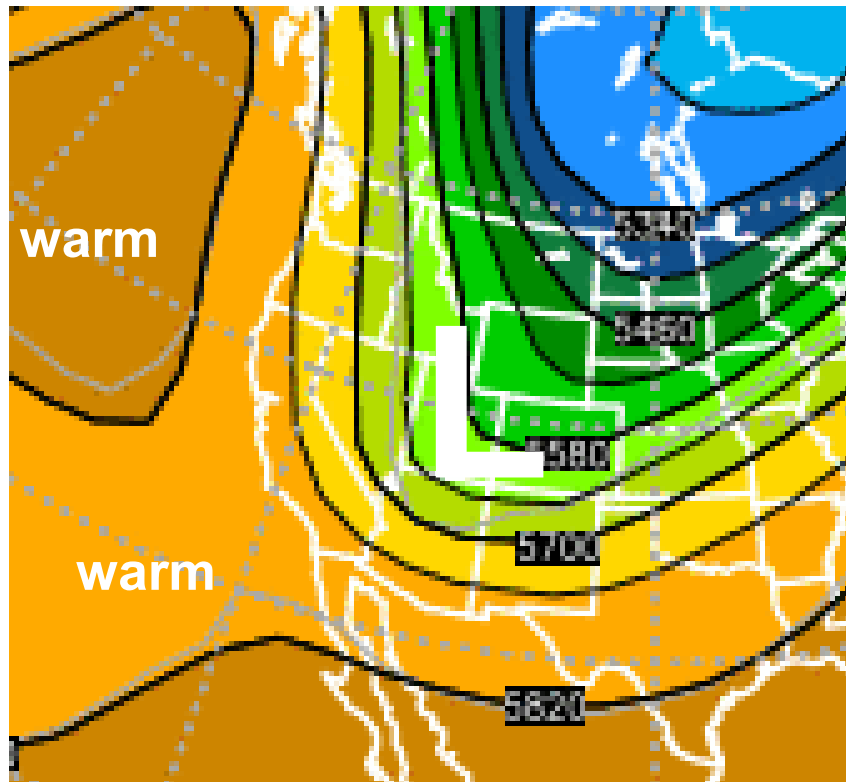


Repeat weather pattern Sunday?

Cold air (high pressure) behind a Great Basin storm

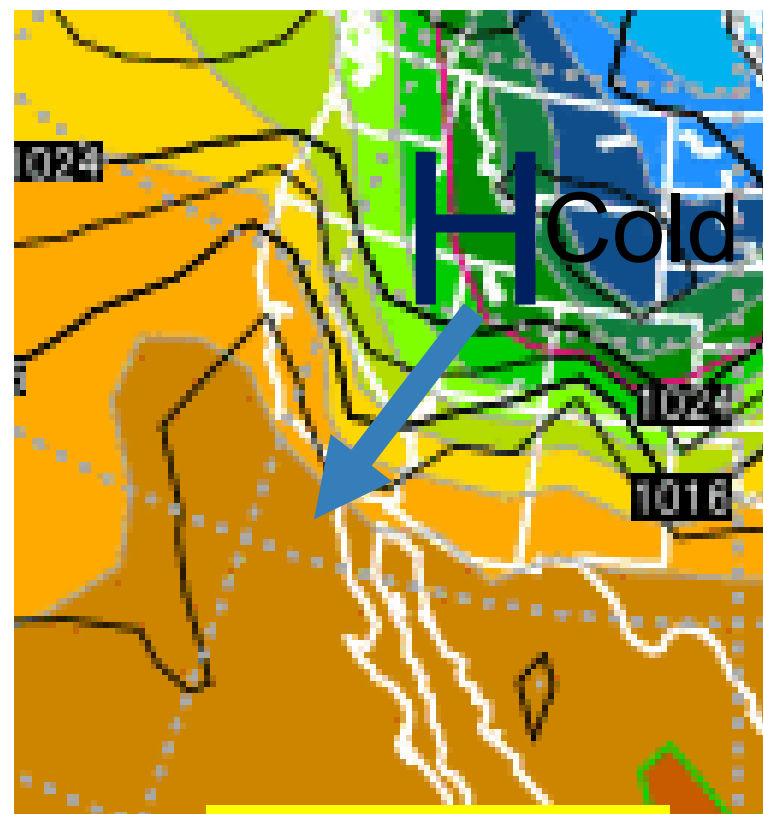


Jet stream



Wind blows dry air offshore

Sunday-Monday weather pattern

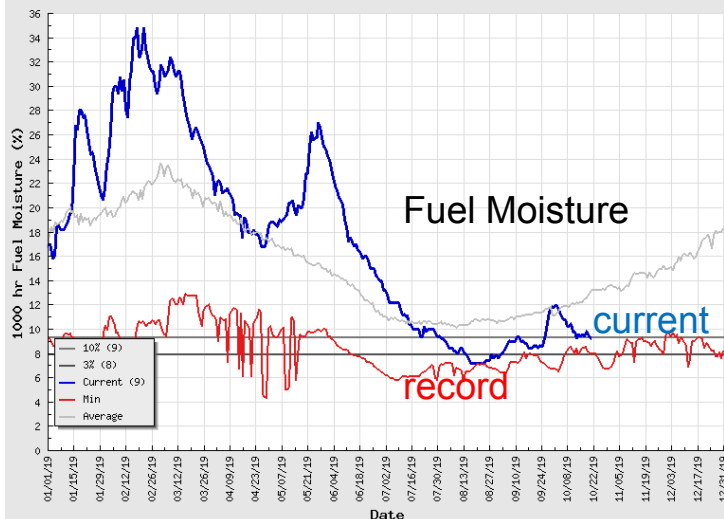


GEFS ensemble
for Sunday-Monday

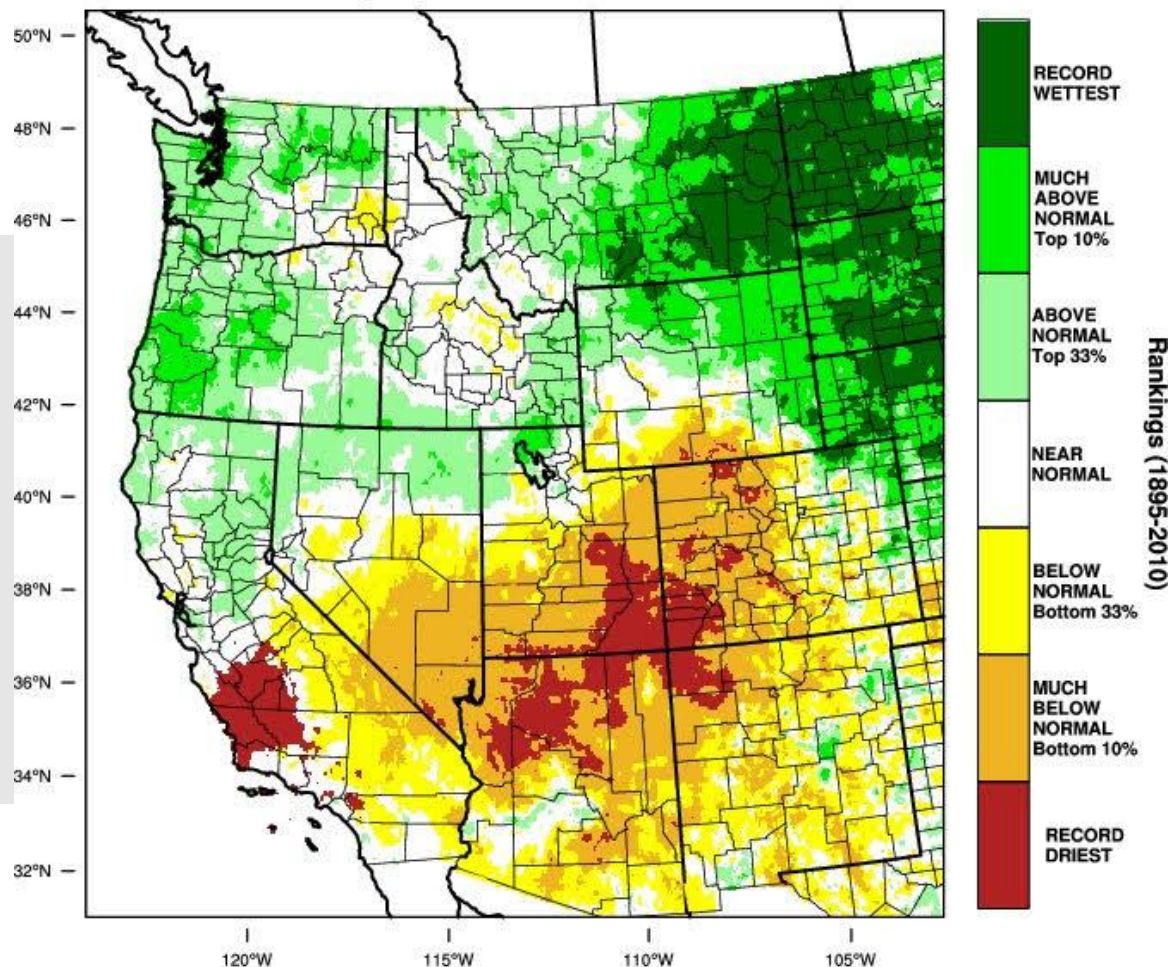
Summer Monsoon was dry

Drier than average fuel

SC11 - Southern Mountains
Valid Date: 21-Oct-2019



Western United States - Precipitation
July-September 2019 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 OCT 2019



Wind for tonight into Friday

Santa Ana (east to northeast) winds



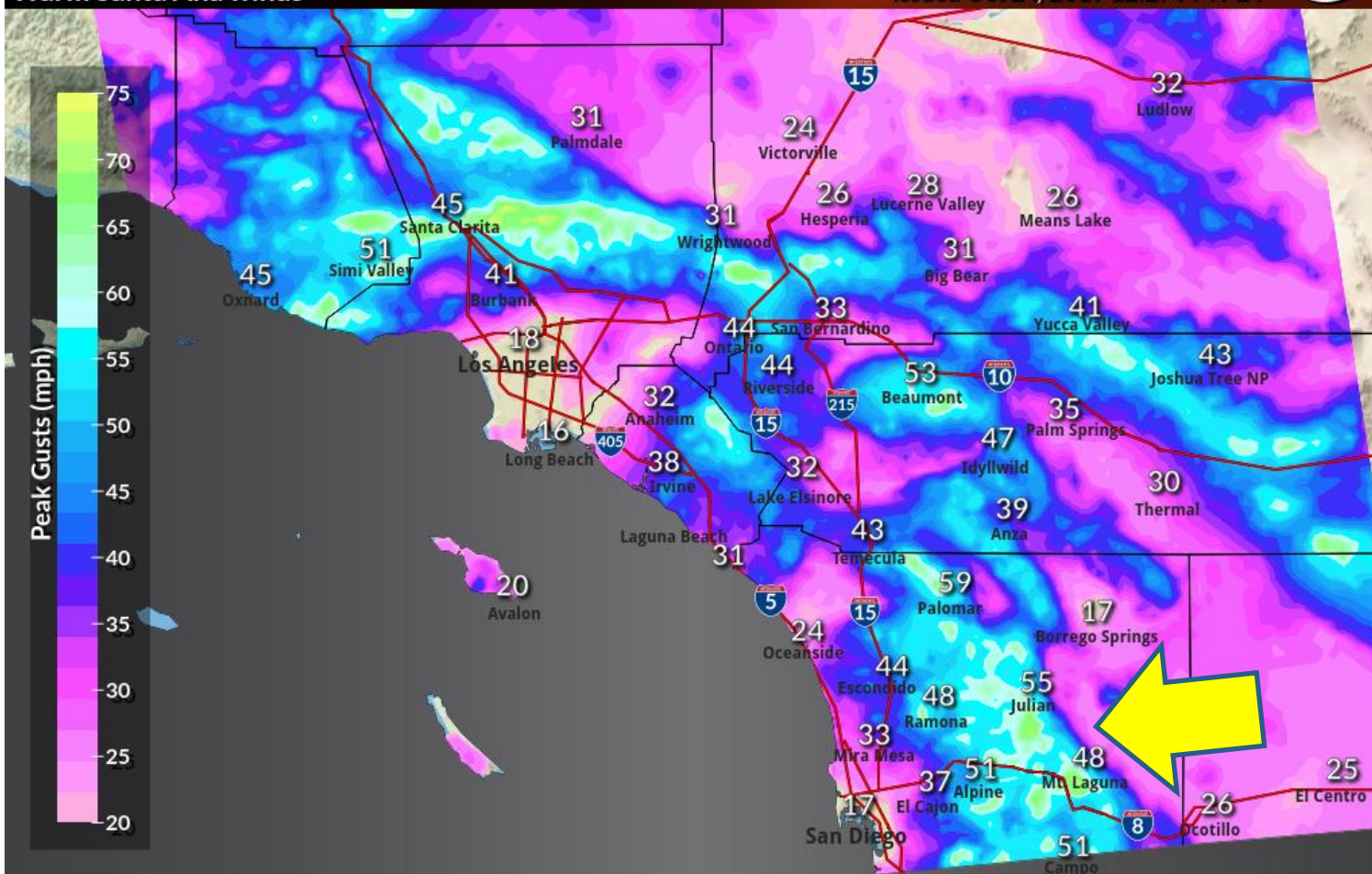
Wind gusts (MPH) into Friday morning

Weather Forecast Office

San Diego, CA

Warm Santa Ana winds

Issued Oct 24, 2019 12:27 PM PDT



NWSSanDiego

weather.gov/sandiego



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Very warm today

Hottest coast due to Santa Ana wind

High Temperatures Today

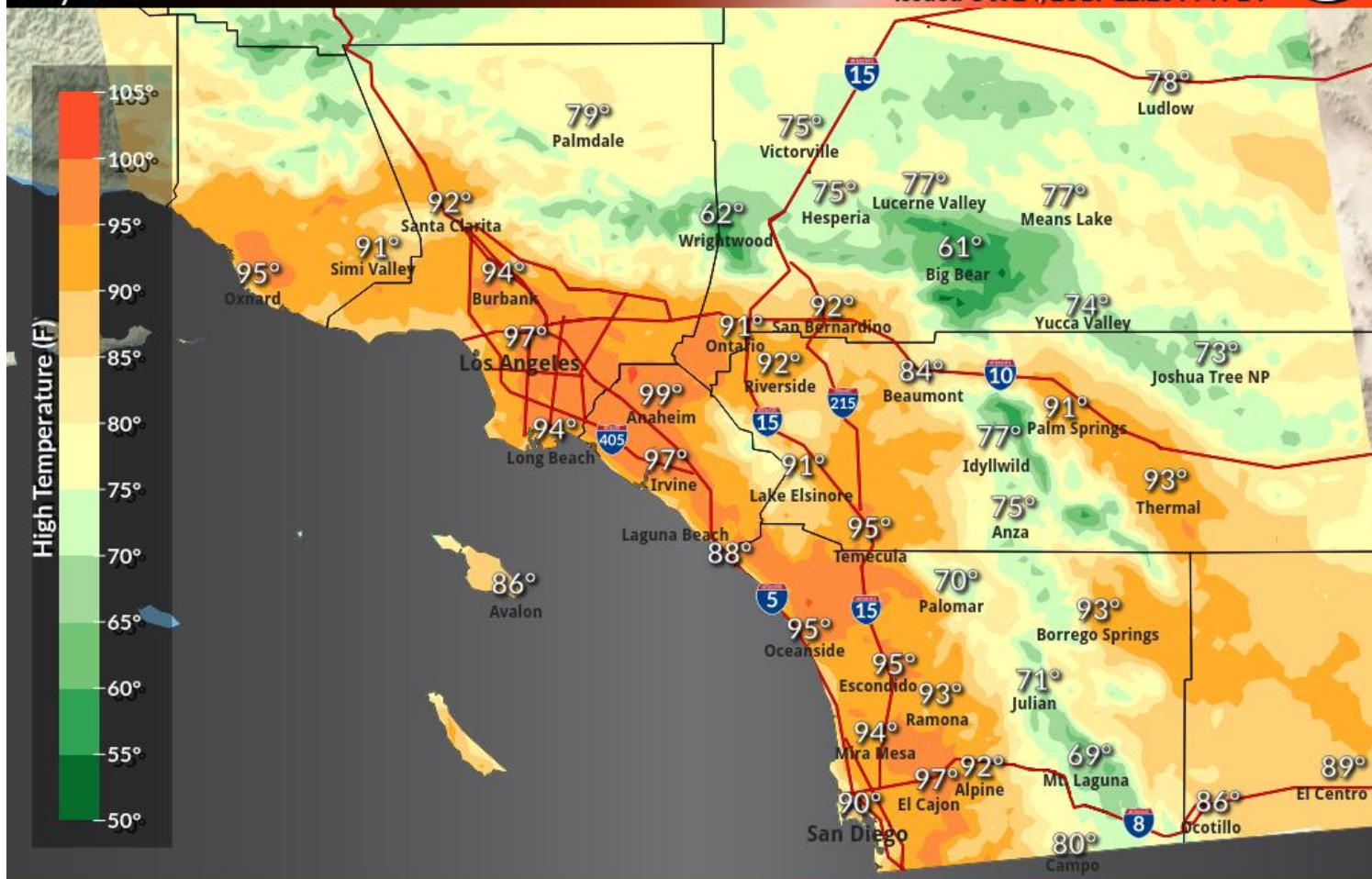
Weather Forecast Office

San Diego, CA

Issued Oct 24, 2019 12:20 PM PDT



Very warm



NWSSanDiego

weather.gov/sandiego



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Very warm conditions

Highest temperatures on Friday



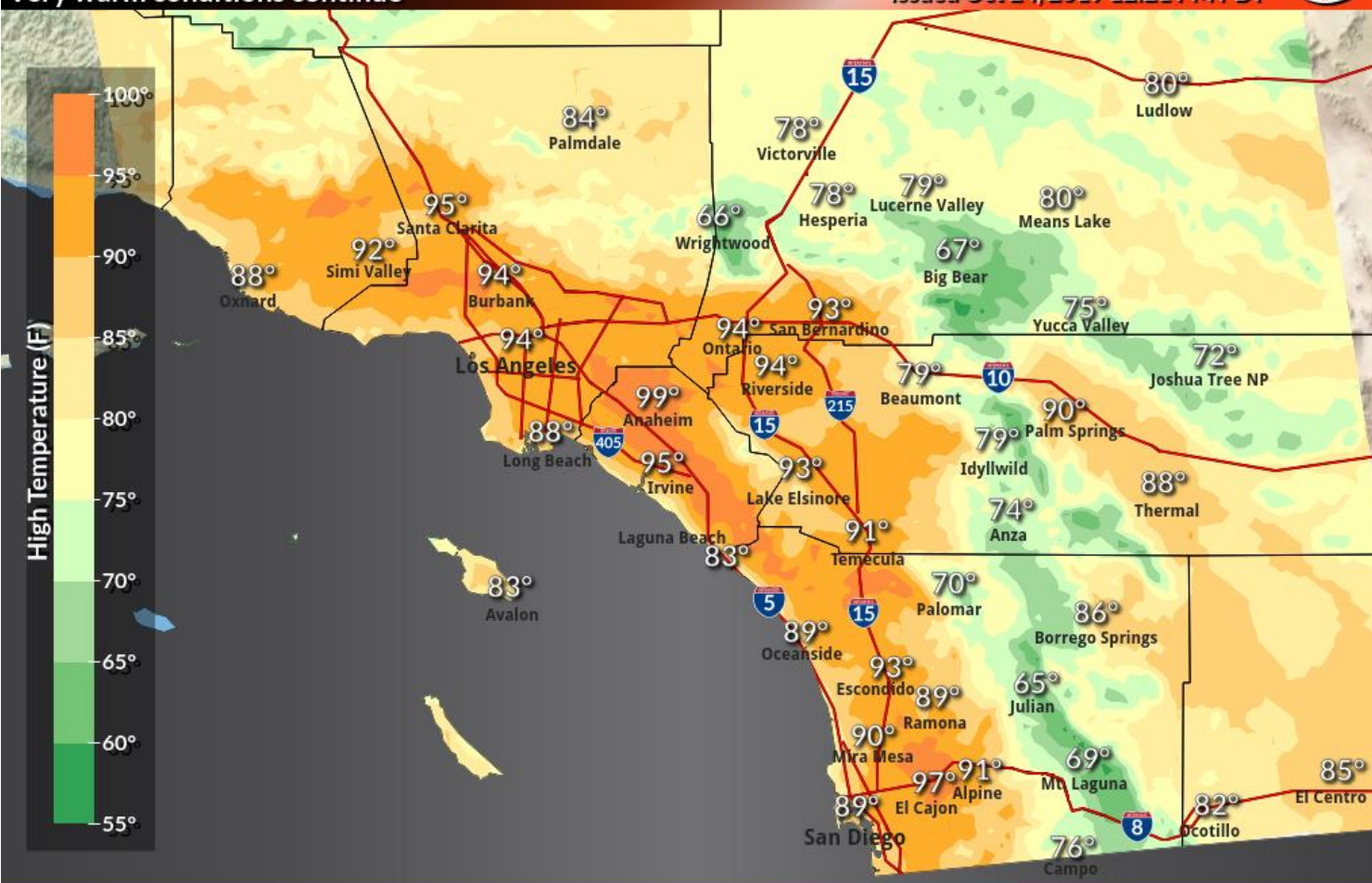
High Temperatures Friday

Very warm conditions continue

Weather Forecast Office

San Diego, CA

Issued Oct 24, 2019 12:21 PM PDT



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Dry air covers the region

Minimum Humidity on Friday



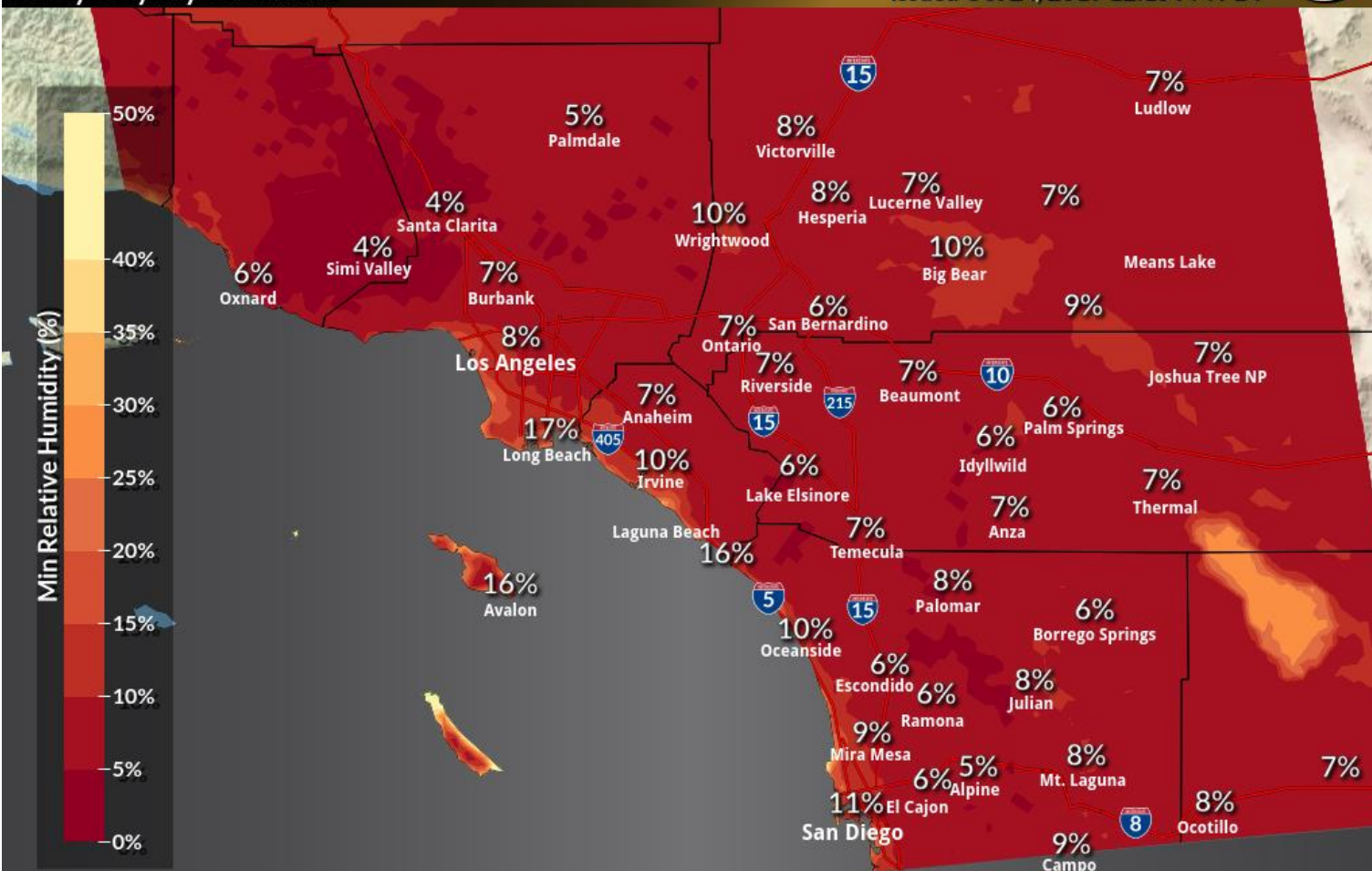
Minimum Humidity (dry) for Friday

Weather Forecast Office

San Diego, CA

Friday very dry conditions

Issued Oct 24, 2019 12:15 PM PDT



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Santa Ana return Sunday-Monday

Strongest Northeast winds



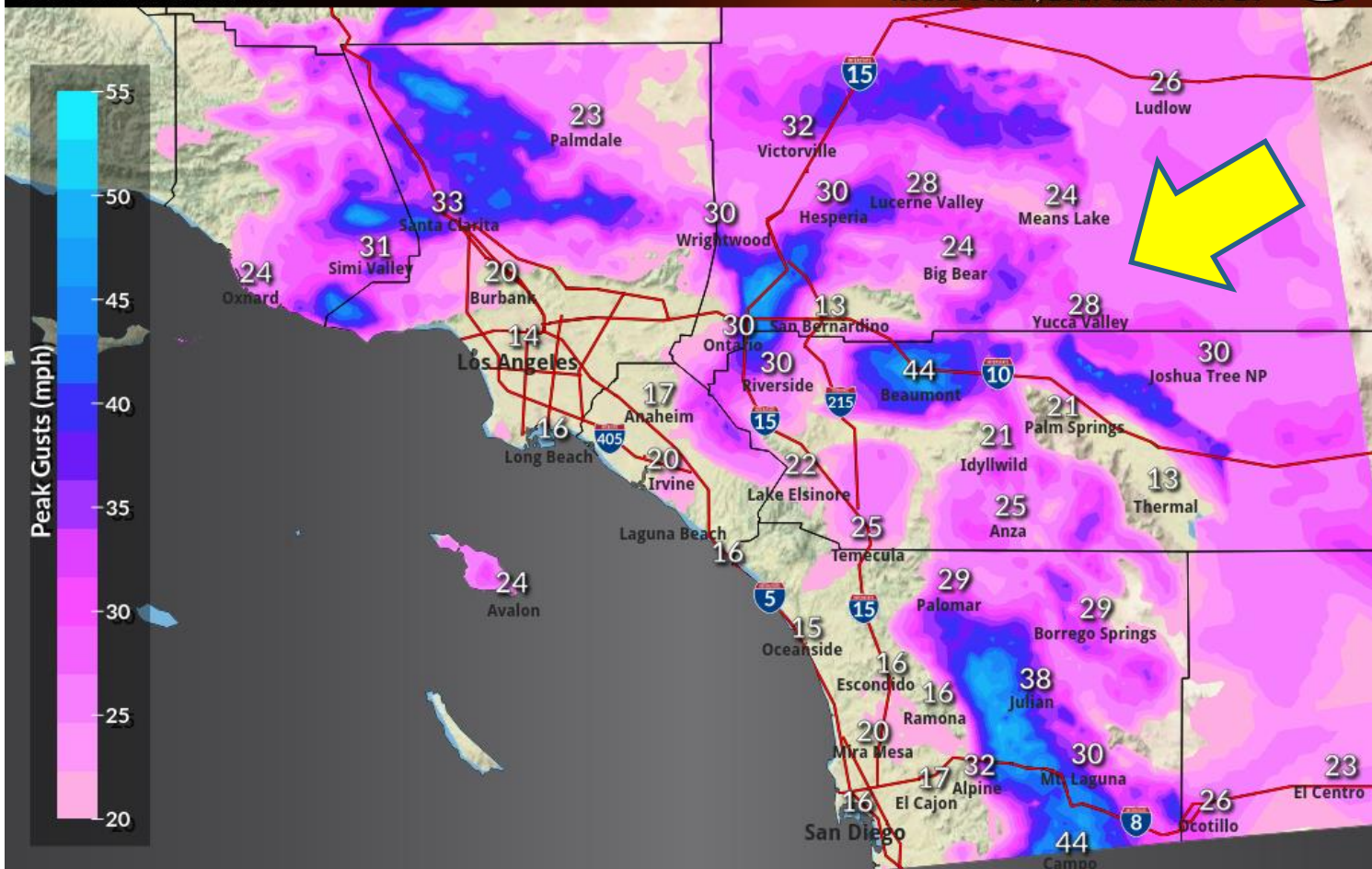
Wind gusts (MPH) Sunday into Monday

Weather Forecast Office

San Diego, CA

Cool Santa Ana winds

Issued Oct 24, 2019 12:29 PM PDT



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Cool north winds

Cool High Temperatures Sunday

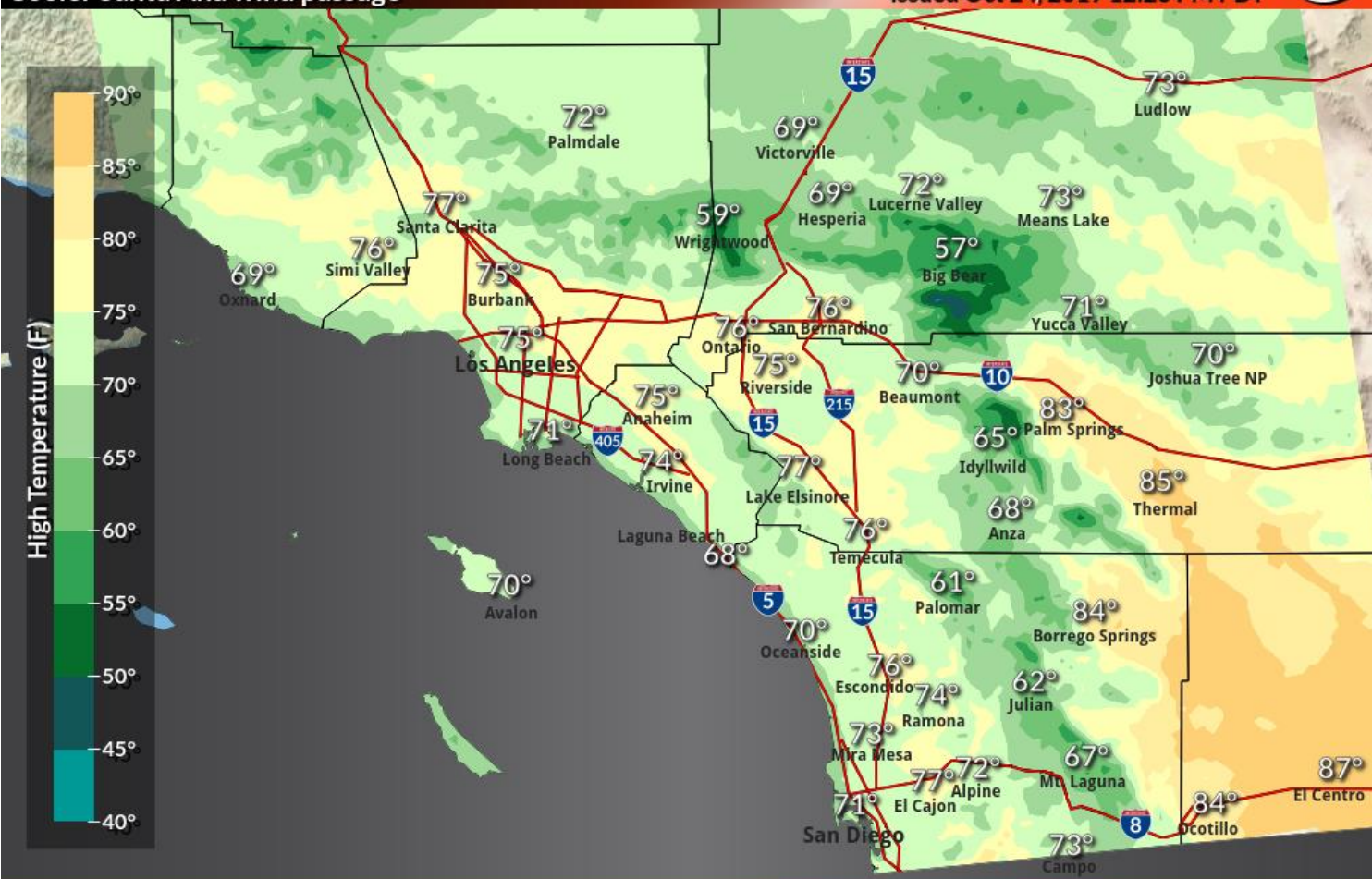
High temperatures on Sunday

Cooler Santa Ana wind passage

Weather Forecast Office

San Diego, CA

Issued Oct 24, 2019 12:23 PM PDT



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Sunday low humidity

Still dry air due to Santa Ana wind

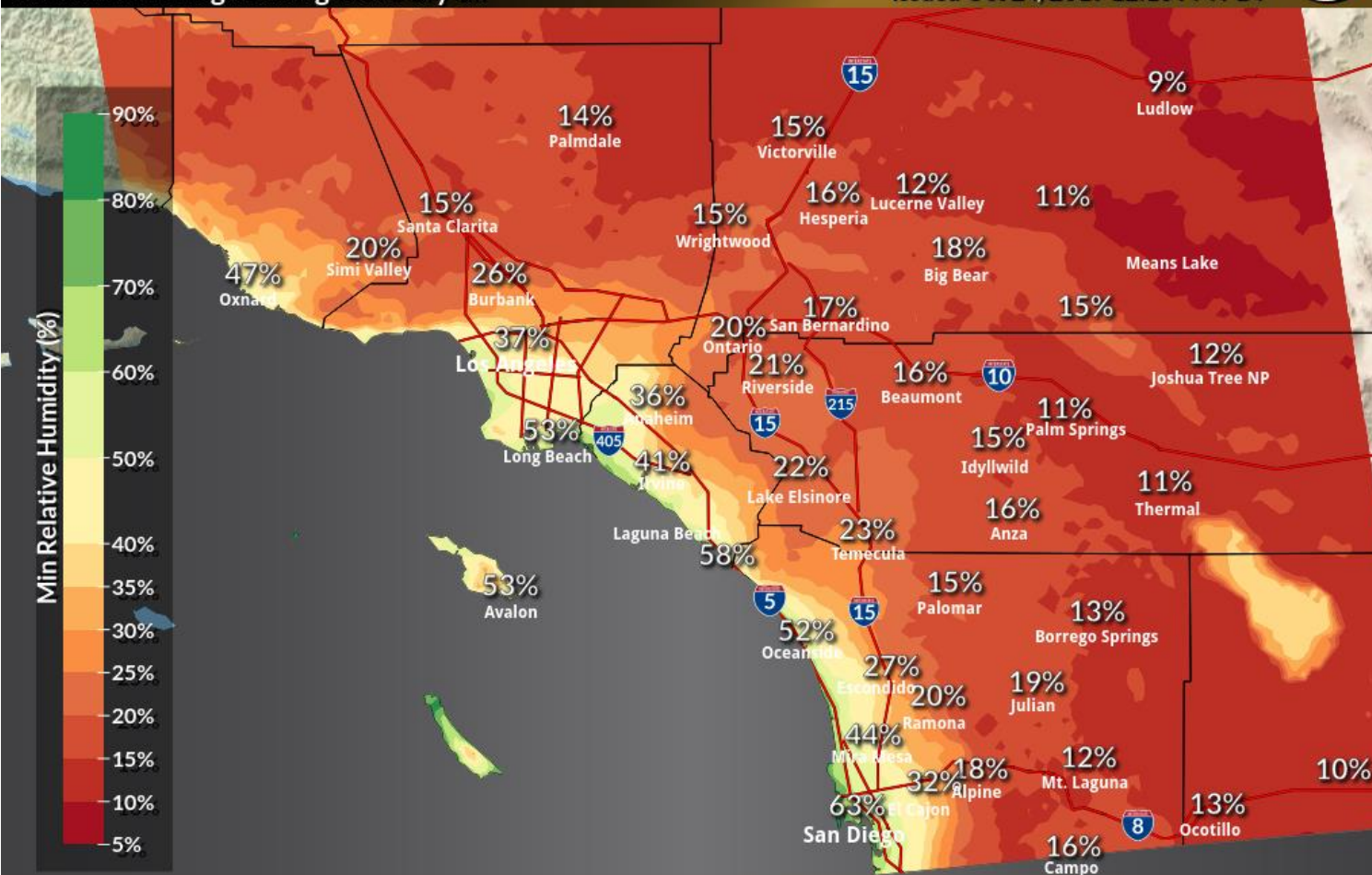
Minimum Humidity (dry) for Sunday

Weather Forecast Office

San Diego, CA

Winds increasing to bring more dry air

Issued Oct 24, 2019 12:16 PM PDT



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Still dry on Monday

Minimum humidity (Santa Ana wind)

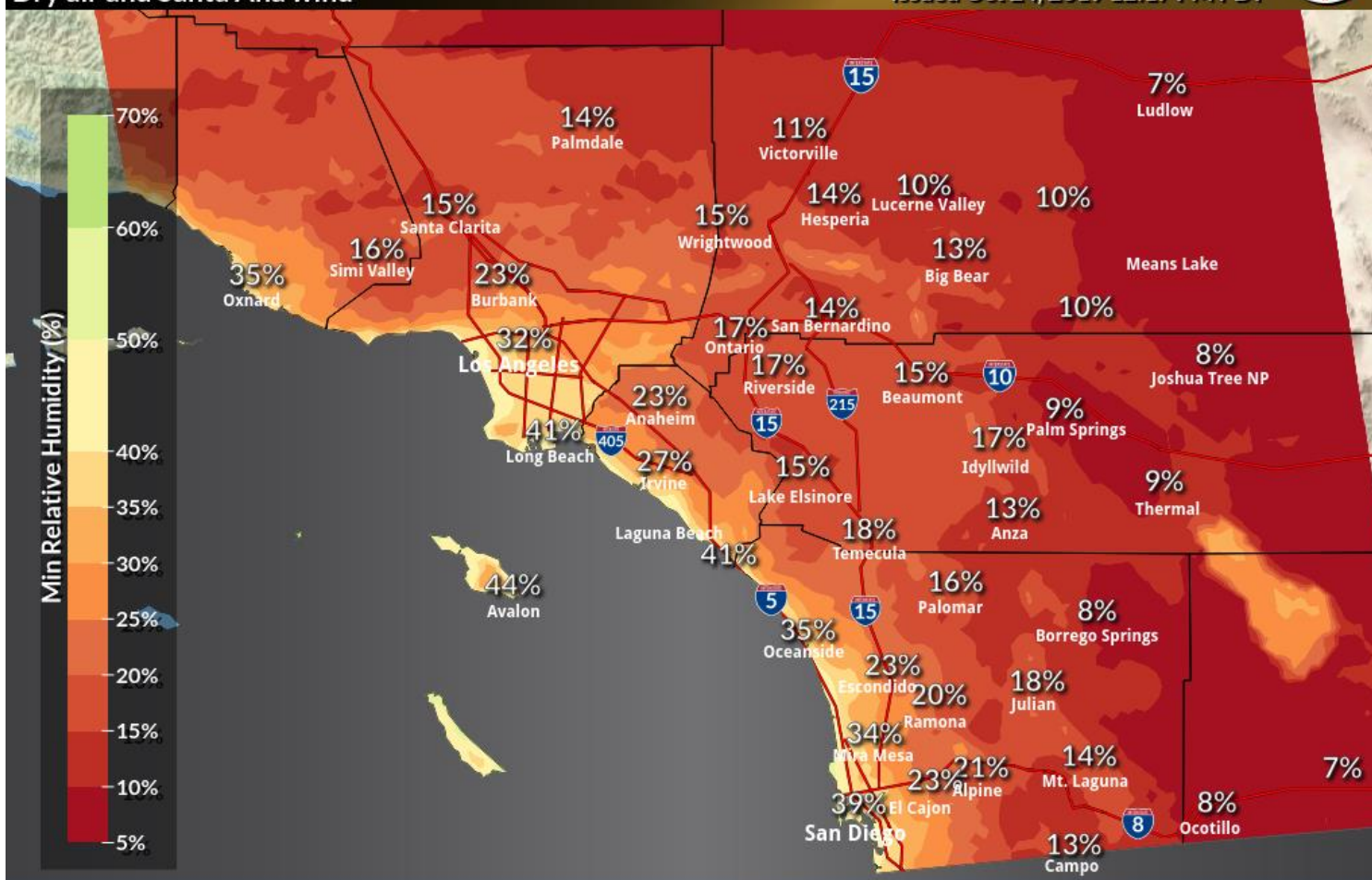
Minimum Humidity (dry) for Monday

Weather Forecast Office

San Diego, CA

Dry air and Santa Ana wind

Issued Oct 24, 2019 12:17 PM PDT



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Building a Weather-Ready Nation



Santa Ana wind conditions

October 24-28, 2019



- ❑ Widespread Santa Ana winds today (Thursday), increasing over mountains, canyons and slopes tonight into Friday morning (round 2)
- ❑ **Very dry** (single digit humidity) and **very warm conditions** (Heat Advisory on coast) into Saturday. Temperatures much above average through Saturday (cooler Sunday) – poor humidity recovery at night
- Moderate Santa Ana wind overall – localized strong wind gusts 75 mph in most wind prone areas (canyons and downslope)
- **Into Friday morning: Wind gusts 35 to 50 mph for most wind prone areas of Santa Ana and San Bernardino mountains and in San Diego mountains**
 - **strongest gusts 70-80 mph. Most areas wind gusts 20 to 40 mph**
- ❑ **Cold Front** – Cool winds (north to northeast) increase quickly on Sunday (round 3) Strongest wind for round 3 Sunday afternoon through Monday morning – this event is weaker for some areas but still gusts 40-60 mph possible wind prone areas
- ❑ Remaining dry and warmer next week with much less wind
- ❑ Low humidity now into Tuesday. High values briefly Saturday night and Sunday morning.
- ❑ Poor humidity recovery Sunday night (dry and mild)





Get Updates!



Fire Weather Watch – Potential for Red Flag Warning

Red Flag Warning – Urgent

High Wind Watch – Potential for damaging high wind warning

High Wind Warning – Urgent high wind potential

Are you getting messages to your phone?
<https://inws.ncep.noaa.gov>

Monitoring Weather (wind and humidity)

<https://www.wrh.noaa.gov/map/?obs=true&wfo=sgx>

For the most up to date forecast and latest watches, warnings and advisories, visit
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Email:
**“SDG&E Weather Briefing 10-21-19 Extreme FPI Today &
Tue”**

SDG&E Weather Briefing 10/21/19 ***Extreme FPI Today & Tue***

Meteorology <Meteorology@semprautilities.com>

Mon 10/21/2019 6:01 AM

To: CS Weather Distribution <CSWeatherDistribution@semprautilities.com>; SDGE - Weather Update <SDGE-WeatherUpdate@semprautilities.com>; Incident Notification-SDGE <IncidentNotification-SDGE@semprautilities.com>

SDG&E Weather Briefing

Monday, October 21, 2019

Safety Talking Point: Safety Reminders During Heat and Winds

- Moderate to high heat, Santa Ana winds, and very dry conditions are forecast to bring the potential for dangerous fire conditions into Tuesday. It's important for us to keep our focus on safety and avoid distractions. No job is complete until we all get home safely.

Today's Fire Potential Index (FPI):

ME	RA	EA	NE	OC	NC	BC	CM
Extreme 15	Extreme 15	Elevated 14	Elevated 14	Elevated 14	Elevated 12	Elevated 12	Elevated 12

Today's FPI Exceptions: None

Executive Summary

- The forecast remains on track for weak Santa Ana winds through Tue
 - Wind gusts peaking at 30-40 mph during the morning hours today and Tue
 - Temperatures in the 80s and 90s with humidity of 5-20%
 - Extreme FPI for ME and RA on Mon and Tue
- Another round of Santa Ana winds are forecast to develop Thu, peak in strength Fri, and diminish Sat
 - This is currently looking like a moderate strength event
 - An Extreme FPI is currently forecast for ME and RA on Thu, and for all inland districts on Fri
- Milder conditions are forecast to return Sunday with cooler temperatures and better humidity recoveries

****Download the Fire Science & Climate Adaptation (FSCA) Weather App****

iOS: http://bit.ly/FSCA_iOS

Android: http://bit.ly/FSCA_Android

Forecast: Click the link below for detailed weather/fire discussions, the full 7-day forecast table, tide report, and weather almanac.

<http://sdgweather.com/email/report-date/2019-10-21>

Seven Day FPI Outlook:

	Mon 10/21	Tue 10/22	Wed 10/23	Thu 10/24	Fri 10/25	Sat 10/26	Sun 10/27
ME	Extreme 15	Extreme 15	Elevated 14	Extreme 15	Extreme 15	Elevated 14	Elevated 13
RA	Extreme 15	Extreme 15	Elevated 14	Extreme 15	Extreme 15	Elevated 14	Elevated 13
EA	Elevated 14	Elevated 14	Elevated 13	Elevated 14	Extreme 15	Elevated 14	Elevated 13
NE	Elevated 14	Elevated 14	Elevated 13	Elevated 14	Extreme 15	Elevated 14	Elevated 13
OC	Elevated 14	Elevated 14	Elevated 13	Elevated 13	Elevated 14	Elevated 13	Elevated 12
NC	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Normal 11
BC	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Normal 11
CM	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Elevated 12	Normal 11

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Katie Giannecchini
Meteorology Data Scientist
Fire Science & Climate Adaptation
San Diego Gas & Electric
(619) 318-7591

“UC Updated Circuit Forecast for Oct 24 thru 25 2019.xlsx”

Station Name	Station	Coc District	Gust Forecast (mph)
Sill Hill	SIL	ME	73
Hellhole Canyon	HHC	NE	54
Boulder Creek	BOC	ME	54
Crestwood	CWD	ME	53
Crestwood	CWD	ME	53
Buckman Springs	BMS	ME	52
East Willows Road	EWR	EA	52
Lucky Five Ranch	LFR	ME	52
Sherilton Valley	SHV	ME	51
La Posta	LPT	ME	50
La Posta	LPT	ME	50
North Boulder Creek	NBC	EA	49
North Boulder Creek	NBC	EA	49
Inaja Park	IJP	NE	48
North Descanso	NDC	ME	48
West Santa Ysabel	WSY	RA	48
Dye Mountain	DYE	NE	48
School House Canyon	SHC	RA	48
Viejas Grade	VGD	EA	47
Hoskings Ranch	HOS	RA	45
Round Potrero	RPO	ME	45
Otay Mountain	OTM	EA	44
Santa Ysabel Ranch	SYR	RA	44
Volcan Mountain	VCM	RA	43
Witch Creek	WCK	RA	43
Hodges Dam	HDM	NE	43
Hodges Dam	HDM	NE	43
Shockey Truck Trail	STT	ME	42
Poomacha	POM	NE	42
Anderson Valley	AVY	EA	41
Rancho Heights	RHS	NE	41
Mesa Grande	MGD	RA	41
North Potrero	NPT	ME	41
North Potrero	NPT	ME	41
Olivenhain	OLV	NE	41
Olivenhain	OLV	NE	41
Wynola	WYN	RA	41
West Wynola	WWY	RA	41
Potrero	POT	ME	41
Laguna	LAG	ME	41
Tierra Del Sol	TDS	ME	41
Harrison Park	HRP	RA	40
Coronado Hills	COH	NE	40
Coronado Hills	COH	NE	40
Coronado Hills	COH	NE	40
Del Dios Highway	DDH	NC	40
Lower Hellhole Canyon	LHC	NE	40
Pacific Crest Trail	PCT	EA	40
Pine Valley	PIV	ME	40
Viejas Mtn Trail	VMT	EA	40
White Star	WST	ME	40
Rockwood	ROC	NE	40
West Descanso	WDC	ME	40
Sweetwater River	SWR	EA	39
Santa Teresa Valley	STV	RA	39
East Warners	EWN	RA	39
Campo	CPO	ME	38
Sunrise Highway	SRH	ME	38
Crestline	CLN	NE	38

Station Name	Station	Coc District	Gust Forecast (mph)
Blue Sky	BLU	NE	38
Rincon Central	RCE	NE	38
Rincon Central	RCE	NE	38
West Rancho Bernardo	WRB	NE	38
Viejas	VJS	ME	38
Mataguay	MGY	RA	38
Barrett Junction	BRJ	ME	38
Sunset Oaks	SSO	RA	38
Cuca Ranch	CCR	NE	38
West Potrero	WPT	ME	37
Japatul Valley Road	JVR	ME	37
Japatul Valley Road	JVR	ME	37
Sequan Truck Trail	SQT	EA	37
Sequan Truck Trail	SQT	EA	37
Sequan Truck Trail	SQT	EA	37
Sequan Truck Trail	SQT	EA	37
San Dieguito River	SDR	NC	37
Lake Cuyamaca	LCM	ME	37
Warners	WAR	RA	37
Boulevard West	BVD	ME	37
Loveland	LLD	EA	37
Loveland	LLD	EA	37
Loveland	LLD	EA	37
Loveland	LLD	EA	37
Corte Madera	CTM	ME	36
Pamo Valley	POV	RA	36
Santa Ysabel North	YSA	RA	36
Santa Ysabel North	YSA	RA	36
Santa Ysabel North	YSA	RA	36
Santa Ysabel North	YSA	RA	36
Santa Ysabel North	YSA	RA	36
Santa Ysabel North	YSA	RA	36
Santa Ysabel North	YSA	RA	36
Lake Morena	MOR	ME	35
Chihuahua Valley	CHH	RA	35
Elfin Forest	ELF	NE	35
Guejito Ranch	GUR	NE	35
Maderas	MAD	NE	35
Paradise Mountain	PMT	NE	35
Rincon Reservation	RCR	NE	35
Pine Hills	PIH	RA	34
Black Mountain Ranch	BMR	NE	34
High Valley	HVL	NE	34
Iron Mountain Trailhead	IMT	RA	34
Julian	JUL	RA	32
Ramona	RAM	RA	31
Linea Del Cielo	LDC	NC	31
Creelman	CLM	RA	31
Highland Valley	HVY	RA	30
Guatay	GTY	ME	30
Rancho Santa Fe	RSF	NC	28

Station Name	Sectionalizing Device	Tielines	VRI	CLIMO 95th
Sill Hill	79-799R	626	Medium	60
Hellhole Canyon	1030-987		Low	50
Boulder Creek	79-799R	626	Medium	44
Crestwood	445-23R	6931, 629,	Low	47
Crestwood	1215-12R	6931, 629,	Low	47
Buckman Springs	441-25R	629	Medium	42
East Willows Road	358-682F		Low	46
Lucky Five Ranch	79-685R		Medium	44
Sherilton Valley	79-673R		Low	42
La Posta	441-23R	629, 6958	Low	45
La Posta	1215-12R	629, 6958	Low	45
North Boulder Creek	79-799R	626	Medium	42
North Boulder Creek	238	626	Medium	42
Inaja Park	222-1364R	626	Medium	43
North Descanso	79-679R	626	Low	43
West Santa Ysabel	222-1370R	637	Low	42
Dye Mountain	222-1370R	637	Low	42
School House Canyon	220-294R		Low	44
Viejas Grade	78-26R		Low	40
Hoskings Ranch	222-1364R		Medium	40
Round Potrero	157-75R	6923	Low	40
Otay Mountain	75-1744R		Low	41
Santa Ysabel Ranch	220-288R	685	Low	39
Volcan Mountain	221-19R		Low	40
Witch Creek	222-1370R, 237-30R		Low	39
Hodges Dam	1105-1479		Low	36
Hodges Dam		1100	Low	36
Shockey Truck Trail	448-11R		Medium	37
Poomacha	214-1122R	682	Medium	37
Anderson Valley	357-1299R		Low	36
Rancho Heights	217-983R		Low	34
Mesa Grande	220-298R		Medium	36
North Potrero	157-84R		Low	38
North Potrero	448-23R		Low	38
Olivenhain	182-2240		Medium	36
Olivenhain		1250	Medium	36
Wynola	221-23R, 221-344R		Medium	39
West Wynola	221-31R, 222-1364R, JU1, OK1, PE1, SL1		Medium	36
Potrero	157-84R, 448-23R		Low	37
Laguna	440-13R		High	35
Tierra Del Sol	445-24R		Medium	37
Harrison Park	222-7R		Medium	36
Coronado Hills	182		N/A	36
Coronado Hills	597		N/A	36
Coronado Hills	185-55		N/A	36
Del Dios Highway	307-234R	616	N/A	34
Lower Hellhole Canyon	1030-23R		Medium	32
Pacific Crest Trail	448-33R		N/A	34
Pine Valley	440-13R, 442-14R	629	Medium	33
Viejas Mtn Trail	357-1147R		N/A	31
White Star	445-21R		N/A	37
Rockwood	1030-989R		Medium	37
West Descanso	73-643R		Low	33
Sweetwater River	73-643R	625	Medium	33
Santa Teresa Valley	222-1370R, 237-30R		Medium	36
East Warners	211-279R		Medium	37
Campo	448-13R		Medium	34
Sunrise Highway	440-13R, 442-14R	629	Medium	33
Crestline	214-583R, CTL1-3R		High	34

Station Name	Sectionalizing Device	Tielines	VRI	CLIMO 95th
Blue Sky	327	634	N/A	35
Rincon Central	216-220R	6926	Medium	36
Rincon Central	909-17R	6926	Medium	36
West Rancho Bernardo	1100		Low	34
Viejas	78-26R, 358-585R, 1458-519		Medium	34
Mataguay	212-638R, 212-734R	685	Medium	36
Barrett Junction	157-87R		Medium	37
Sunset Oaks	237-30R		Medium	36
Cuca Ranch	214-1122R	682	Medium	33
West Potrero	157-75R, 448-23R		Medium	35
Japatul Valley Road	73-765R	625	Medium	33
Japatul Valley Road	1166-18R	625	Medium	33
Sequan Truck Trail	283-55R	625, 6957	Medium	35
Sequan Truck Trail	1166-15R	625, 6957	Medium	35
Sequan Truck Trail	1166-18R	625, 6957	Medium	35
Sequan Truck Trail	DV1	625, 6957	Medium	35
San Dieguito River	307-234R, SF3-19R		N/A	31
Lake Cuyamaca	79-658R		Medium	34
Warners	210-172R, 211-279R, 212-638R, 212-734R	682	Medium	35
Boulevard West	444-43R, 445-39R	6931	Medium	34
Loveland	283	6904, 6914	Medium	33
Loveland	357	6904, 6914	Medium	33
Loveland	1166	6904, 6914	Medium	33
Loveland	DV1	6904, 6914	Medium	33
Corte Madera	442-16R		Medium	30
Pamo Valley	237-2R		Low	31
Santa Ysabel North	220-288R	626, 685	Low	33
Santa Ysabel North	221-19R	626, 685	Low	33
Santa Ysabel North	221-31R	626, 685	Low	33
Santa Ysabel North	222-1364R	626, 685	Low	33
Santa Ysabel North	222-1370R	626, 685	Low	33
Santa Ysabel North	JU1	626, 685	Low	33
Santa Ysabel North	PE1	626, 685	Low	33
Lake Morena	449-6R		Medium	32
Chihuahua Valley	212-652R		Low	32
Elfin Forest	597-592, 1001-1140, 118-1F		N/A	29
Guejito Ranch	1030-989R		Medium	32
Maderas	175-24R	634	N/A	30
Paradise Mountain	1030-18R		Medium	30
Rincon Reservation	909-17R		Medium	32
Pine Hills	222-1364R, PE1		High	30
Black Mountain Ranch	1101	6920	N/A	29
High Valley	176-58R		N/A	29
Iron Mountain Trailhead	176-58R		N/A	29
Julian	221-31R, 222-1364R, JU1, OK1, SL1		High	30
Ramona	236-10R		High	30
Linea Del Cielo	66-1213R, 305	674	N/A	27
Creelman	971-29R, 973-630R, 974-35R	635, 6917	High	30
Highland Valley	176-26R, 971-26R, 972-30R		High	29
Guatay	79-676R	629	Medium	27
Rancho Santa Fe	305-32R, 307-1492R, 1001-1130, SF3-19R		High	24

Station Name	CLIMO 99th	CLIMO Max	Alert Wind Speed	Reason
Sill Hill	81	101	40	TC&C
Hellhole Canyon	62	82	40	TC&C
Boulder Creek	57	72	40	TC&C
Crestwood	58	76	40	TC&C
Crestwood	58	76	45	
Buckman Springs	55	87	45	
East Willows Road	60	72	40	TC&C
Lucky Five Ranch	57	69	45	
Sherilton Valley	54	65	40	TC&C
La Posta	54	69	40	TC&C
La Posta	54	69	45	
North Boulder Creek	53	69	40	TC&C
North Boulder Creek	53	69	45	
Inaja Park	53	66	40	TC&C
North Descanso	52	69	40	TC&C
West Santa Ysabel	52	75	40	TC&C
Dye Mountain	54	63	40	TC&C
School House Canyon	53	66	40	TC&C
Viejas Grade	53	77	40	TC&C
Hoskings Ranch	52	63	40	TC&C
Round Potrero	50	65	40	TC&C
Otay Mountain	52	64	45	
Santa Ysabel Ranch	49	64	40	TC&C
Volcan Mountain	50	60	45	
Witch Creek	49	62	40	TC&C
Hodges Dam	46	54	45	
Hodges Dam	46	54	40	TC&C
Shockey Truck Trail	46	61	40	TC&C
Poomacha	47	56	40	TC&C
Anderson Valley	48	56	45	
Rancho Heights	50	64	45	
Mesa Grande	47	54	40	TC&C
North Potrero	46	55	40	TC&C
North Potrero	46	55	40	TC&C
Olivenhain	44	54	44	99th
Olivenhain	44	54	40	TC&C
Wynola	45	54	40	TC&C
West Wynola	46	56	40	TC&C
Potrero	46	60	40	TC&C
Laguna	44	56	35	95th, H_VRI
Tierra Del Sol	44	54	40	TC&C
Harrison Park	48	57	40	TC&C
Coronado Hills	44		44	99th
Coronado Hills	44		40	TC&C
Coronado Hills	44		40	TC&C
Del Dios Highway	42		42	99th
Lower Hellhole Canyon	44	45	40	TC&C
Pacific Crest Trail	42		40	TC&C
Pine Valley	42	57	40	TC&C
Viejas Mtn Trail	44	49	40	TC&C
White Star	44		40	TC&C
Rockwood	47	56	40	TC&C
West Descanso	42	62	42	99th
Sweetwater River	42	55	40	TC&C
Santa Teresa Valley	47	54	40	TC&C
East Warners	43	54	40	TC&C
Campo	42	55	40	TC&C
Sunrise Highway	45	69	40	TC&C
Crestline	45	54	34	95th, H_VRI

Station Name	CLIMO 99th	CLIMO Max	Alert Wind Speed	Reason
Blue Sky	45			45
Rincon Central	45	47		45
Rincon Central	45	47		40 TC&C
West Rancho Bernardo	42	49		40 TC&C
Viejas	43	58		40 TC&C
Mataguay	44	52		40 TC&C
Barrett Junction	43	53		40 TC&C
Sunset Oaks	44	53		40 TC&C
Cuca Ranch	46	61		40 TC&C
West Potrero	42	50		40 TC&C
Japatul Valley Road	42	52		40 TC&C
Japatul Valley Road	42	52		42 99th
Sequan Truck Trail	43	53		40 TC&C
Sequan Truck Trail	43	53		43 99th
Sequan Truck Trail	43	53		43 99th
Sequan Truck Trail	43	53		40 TC&C
San Dieguito River	39			39 99th
Lake Cuyamaca	42	53		40 TC&C
Warners	41	52		40 TC&C
Boulevard West	42	57		40 TC&C
Loveland	44	50		40 TC&C
Loveland	44	50		40 TC&C
Loveland	44	50		44 99th
Loveland	44	50		40 TC&C
Corte Madera	40	61		40 99th
Pamo Valley	43	63		40
Santa Ysabel North	41	52		40 TC&C
Santa Ysabel North	41	52		41 99th
Santa Ysabel North	41	52		40 TC&C
Santa Ysabel North	41	52		40 TC&C
Santa Ysabel North	41	52		40 TC&C
Santa Ysabel North	41	52		40 TC&C
Santa Ysabel North	41	52		40 TC&C
Lake Morena	39	53		39 99th
Chihuahua Valley	41	50		40 TC&C
Elfin Forest	36			36 99th
Guejito Ranch	37	49		37 99th
Maderas	39			39 99th
Paradise Mountain	40	43		40
Rincon Reservation	39	56		39 99th
Pine Hills	38	53		30
Black Mountain Ranch	36			36 99th
High Valley	36			36 99th
Iron Mountain Trailhead	36			36 99th
Julian	37	44		30 95th, H_VRI
Ramona	36	48		30 95th, H_VRI
Linea Del Cielo	33			33 99th
Creelman	36	50		30 95th, H_VRI
Highland Valley	38	41		29 95th, H_VRI
Guatay	36	46		40 TC&C
Rancho Santa Fe	30	37		24 95th, H_VRI

“Updated Circuit Forecast - 10_30-31_19.xlsx”

Updated Circuit Forecast - 10_30-31_19

Tab: Full List - Oct 30-31

Station Name	Station	Coc District	Wed	Gust	Fri	Event	Max	Sectionalizing Device	Tie Lines	VRI	CLIMO 95th	CLIMO 99th	CLIMO Max
Sill Hill	SIL	ME	74	81	81	79-799R			626	Medium	60	81	101
Boulder Creek	BOC	ME	56	61	61	79-799R			626	Medium	44	57	72
North Boulder Creek	NBC	EA	56	61	61	79-799R, 238			626	Medium	42	53	69
Hellhole Canyon	HHC	NE	54	60	60	1030-987				Low	50	62	82
Buckman Springs	BMS	ME	51	58	58	441-25R			629	Medium	42	55	87
Crestwood	CWD	ME	57	53	57	445-23R, 1215-12R			6931, 629,	Low	47	58	76
East Willows Road	EWR	EA	51	56	56	358-682F				Low	46	60	72
Lucky Five Ranch	LFR	ME	51	56	56	79-685R				Medium	44	57	69
Sherilton Valley	SHV	ME	51	56	56	79-673R				Low	42	54	65
Inaja Park	IJP	NE	50	54	54	222-1364R			626	Medium	43	53	66
West Santa Ysabel	WSY	RA	50	54	54	222-1370R			637	Low	42	52	75
Dye Mountain	DYE	NE	47	53	53	222-1370R			637	Low	42	54	63
La Posta	LPT	ME	49	53	53	441-23R, 1215-12R			629, 6958,	Low	45	54	69
North Descanso	NDC	ME	47	53	53	79-679R			626	Low	43	52	69
Viejas Grade	VGD	EA	48	53	53	78-26R				Low	40	53	77
Hoskings Ranch	HOS	RA	47	52	52	222-1364R				Medium	40	52	63
Rancho Heights	RHS	NE	52	44	52	217-983R				Low	34	50	64
Round Potrero	RPO	ME	50	46	50	157-75R			6923, 5000	Low	40	50	65
School House Canyon	SHC	RA	50	44	50	220-294R				Low	44	53	66
Otay Mountain	OTM	EA	45	49	49	75-1744R				Low	41	52	64
Potrero	POT	ME	49	44	49	157-84R, 448-23R				Low	37	46	60
Santa Ysabel Ranch	SYR	RA	45	49	49	220-288R			685	Low	39	49	64
Cuca Ranch	CCR	NE	48	38	48	214-1122R			682	Medium	33	46	61
North Potrero	NPT	ME	48	44	48	157-84R, 448-23R				Low	38	46	55
Anderson Valley	AVY	EA	41	47	47	357-1299R				Low	36	48	56
Maderas	MAD	NE	42	47	47	175-24R			634	Low	29	36	
Mesa Grande	MGD	RA	47	43	47	220-298R				Medium	36	47	54
Pacific Crest Trail	PCT	EA	45	47	47	448-33R			50001	Medium	34	42	
Poomacha	POM	NE	41	47	47	214-1122R			682	Medium	37	47	56
Tierra Del Sol	TDS	ME	43	47	47	445-24R				Medium	37	44	54
Witch Creek	WCK	RA	42	47	47	222-1370R, 237-30R				Low	39	49	62
Pine Valley	PIV	ME	41	46	46	440-13R, 442-14R (opens 79-658R)				Medium	33	42	57
Santa Teresa Valley	STV	RA	42	46	46	222-1370R, 237-30R				Medium	36	47	54
Shockey Truck Trail	STT	ME	41	46	46	448-11R				Medium	37	46	61
Volcan Mountain	VCN	RA	43	46	46	221-19R				Low	40	50	60
Chihuahua Valley	CHH	RA	45	37	45	212-652R				Low	32	41	50
Harrison Park	HRP	RA	41	45	45	222-7R				Medium	36	48	57
High Valley	HVL	NE	42	45	45	176-58R				Low	29	36	
Mataguay	MGY	RA	41	45	45	212-638R, 212-734R, 212			685	Medium	36	44	52
Rockwood	ROC	NE	45	45	45	1030-989R				Medium	37	47	56
Sunrise Highway	SRH	ME	41	45	45	440-13R, 442-14R			629	Medium	33	45	69
West Wynola	WWY	RA	41	45	45	221-31R, 222-1364R, JU1, OK1, PE1, SL1				Medium	36	46	56
Laguna	LAG	ME	40	44	44	440-13R				High	35	44	56
Lake Cuyamaca	LCM	ME	40	44	44	79-658R				Medium	34	42	53
Sunset Oaks	SSO	RA	44	40	44	237-30R				Medium	36	44	53
Sweetwater River	SWR	EA	40	44	44	73-643R, 73			625	Medium	33	42	55
Talega	TLG	OC	44	35	44	N/A				N/A	32	39	51
West Descanso	WDC	ME	40	44	44	73-643R, 73			625	Low	33	42	62
Wynola	WYN	RA	40	44	44	221-23R, 221-344R				Medium	39	45	54
Barrett Junction	BRJ	ME	43	39	43	157-87R			50001	Medium	37	43	53
Hodges Dam	HDM	NE	43	30	43	1100, 1105-1479				Low	36	46	54
Blue Sky	BLU	NE	42	42	42	327			634	Low	27	34	
Crestline	CLN	NE	42	39	42	214-583R, CTL1-3R				High	34	45	54
Rincon Central	RCE	NE	42	36	42	216-220R, 909-17R			6926	Medium	36	45	47
Santa Ysabel North	YSA	RA	38	42	42	220-288R, 221-19R, 221-31R, 222-1364R, 222-1370R, JU1, PE1			626, 685	Low	33	41	52
Viejas	VJS	ME	42	38	42	78-26R, 358-585R, 1458-519				Medium	34	43	58
Boulevard West	BVD	ME	38	41	41	444-43R, 445-39R			6931, 5000	Medium	34	42	57
Campo	CPO	ME	37	41	41	448-13R			50001	Medium	34	42	55
East Warners	EWN	RA	40	41	41	211-279R				Medium	37	43	54
Elfin Forest	ELF	NC	41	30	41	597-592, 1001-1140, 1118-1F				Medium	29	36	
Guejito Ranch	GUR	NE	41	38	41	1030-989R				Medium	32	37	49
Japatul Valley Road	JVR	ME	37	41	41	73-765R, 1166-18R			625	Medium	33	42	52
Loveland	LLD	EA	41	35	41	283, 357, 1166, DV1			6904, 6914	Medium	33	44	50
Nate Harrison Grade	NHG	NE	41	27	41	217-837R				Medium	26	37	62
Olivenhain	OLV	NE	41	30	41	182-2240, 1250				Medium	36	44	54
Ortega	ORT	OC	41	35	41	1243-45R				Low	33	39	50
Sequan Truck Trail	SQT	EA	41	37	41	283-55R, 1166-15R, 1166-18R, DV1			625, 6957	Medium	35	43	53
Warners	WAR	RA	39	41	41	210-172R, 211-279R, 212-638R, 212-734R, 212			682	Medium	35	41	52
West Potrero	WPT	ME	36	41	41	157-75R, 448-23R				Medium	35	42	50
White Star	WST	ME	41	41	41	445-21R				Medium	37	44	
Fruitvale	FTV	NE	40	36	40	215-38R				Medium	32	40	53
Goose Valley	GOS	RA	40	38	40	237-2R				Medium	32	40	50
Iron Mountain Trail	IMT	NE	40	40	40	176-58R				Low	29	36	
Pamo Valley	POV	RA	33	40	40	237-2R				Low	31	43	63
Paradise Mountain	PMT	NE	40	36	40	1030-18R				Medium	30	40	43
Rincon Reservation	RCR	NE	40	36	40	909-17R				Medium	32	39	56
Victoria	VIC	EA	40	34	40	357-1147R, 1458-454				Medium	30	41	48
Viejas Mtn Trail	VMT	NE	36	40	40	357-1147R				N/A	31	44	49
Country Estates	CES	RA	39	36	39	222-1401R, 222-1441R			637	Medium	31	40	64
Escondido	ESC	NE	39	30	39	450-50R, 452-38AE, 454-47R, 907-1716R			681	Medium	26	33	41
Pauma Creek	PCK	NE	39	20	39	217-837R, PY1				Medium	29	38	49
Corte Madera	CTM	ME	35	38	38	442-16R				Medium	30	40	61
Otay Mesa Border	OMB	CM	38	32	38	260, 536-150R, 840				N/A	31	39	54
Spangler Peak	SPP	RA	38	34	38	973-626R, 973-649R				Low	34	41	50
Lake Morena	MOR	ME	36	37	37	449-6R				Medium	32	39	53
Lower Hellhole Canyon	LHC	NE	36	37	37	1030-23R				Medium	32	44	45
Barona Mesa	BRM	RA	36	33	36	973-626R				Low	29	39	46
Dulzura	DZR	ME	36	33	36	157-87R				N/A	32	41	52
Highland Valley	HVY	RA	36	33	36	176-26R, 971-26R, 972-30R, 972-26R				High	29	38	41
Julian	JUL	RA	33	36	36	221-31R, 222-1364R, JU1, OK1, SL1				High	30	37	44
Mussey Grade	MGR	RA	36	22	36	971-26R, MOR1			6917	Medium	26	35	49
Pine Hills	PIH	RA	33	36	36	222-1364R, PE1				High	30	38	53
Black Mountain Ranch	BMR	NE	35	25	35	1101			6920	Low	29	36	
Coronado Hills	COH	NE	35	20	35	182, 185-55, 597				Medium	36	44	
Marion Canyon	MCN	NE	35	32	35	217-835R				Medium	30	36	38
Ramona	RAM	RA	35	29	35	236-10R				High	30	36	48
Wisecarver	WCV	ME	35	30	35	157-77R, 524-50R, 524-69R				Medium	27	37	51
Archie Moore	ARH	RA	34	30	34	175-64R, 176-199				Medium	31	39	46

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Station Name	Station	Coc District	Wed	Gust	F	Thu	Gust	Fi	Event	Max	Sectionalizing Device	Tielines	VRI	CLIMO 95th	CLIMO 99th	CLIMO Max
Cameron Corners	CMC	ME	34	29	34	448-9R, 449-6R						6923, 6958	N/A	29	35	54
Guatay	GTY	ME	33	34	34	79-676R						629	Medium	27	36	46
Lake Wohlford	LKW	NE	34	29	34	907-1702R, 1030-42R							Medium	30	39	46
West Rancho Bernardo	WRB	NE	34	25	34	1100							Low	34	42	49
Border Field	BFD	CM	33	30	33	334-21							N/A	30	35	44
Creelman	CLM	RA	33	25	33	971-29R, 973-630R, 974-35R						635, 6917	High	30	36	50
Dehesa	DEH	EA	33	31	33	283						6914	Medium	30	39	48
Pala Temecula	PTM	NE	33	24	33	217-983, 1233-252R, RB1-19R, TM1-10R							Low	24	35	47
Rainbow	RNB	NE	33	30	33	239-15R, 521-18R, 1233-252R, RB1-30R							Medium	28	34	43
San Pasqual Valley	SPV	NE	33	30	33	470-47R, 972-30R, 972-26R							Medium	29	36	41
Black Canyon	BLC	NE	32	29	32	237-2R							Medium	28	33	42
Deerhorn Valley	DHV	ME	32	30	32	67-34R							Medium	26	35	47
Del Dios Hwy	DDH	NC	32	20	32	307-234R						616	Low	34	42	
Del Mar Heights	DMH	NC	32	18	32	68							N/A	25	33	39
Hideaway Lake	HID	NE	32	25	32	907-1602, 907-1716R, 908-1236R, 1021, 1022-17F							High	28	35	45
Highland Valley West	HVW	RA	32	26	32	175-90R							Medium	28	34	43
Oak Grove	OGV	RA	30	32	32	212-650R							Low	30	36	43
Palo Verde	PVD	EA	32	25	32	357-750R							Medium	29	37	43
San Dieguito River	SDR	NE	32	18	32	307-234R, 5F3-19R							High	31	39	
Cristianitos	CRI	OC	31	20	31	338-6R, 339-478R, 339-480R						23030	Low	24	30	39
Los Coyotes	COY	RA	31	28	31	210-172R							Medium	26	33	44
Peutz Valley	PTZ	EA	31	27	31	356-19R, 1458-565						629	Medium	28	35	39
Barona	BNA	EA	30	25	30	240-1097R, 974-35R						635	Medium	25	33	42
Carlsbad	CBD	NC	30	15	30	286, 303, 783							N/A	24	33	37
In-Ko-Pah	IKP	ME	30	30	30	444-15R							Low	28	34	47
Lawson Creek	LCK	EA	27	30	30	157-77R, 524-50R, 524-69R							Low	25	32	40
Rancho Santa Fe	RSF	NC	30	18	30	305-32R, 307-1492R, 1001-1130, 5F3-19R							High	24	30	37
Rincon	RIN	NE	30	25	30	214-565R, 215-38R, 216-220R, 217-837R						683, 682	Medium	28	35	41
Sky Valley	SVL	ME	28	30	30	157-77R						6957, 5000	Low	26	31	44
Solana Beach	SOB	NC	30	15	30	62, 63, 66-1213R, 286, 288, 1081							N/A	31	35	35
Sunshine Summit	SSS	RA	27	30	30	212-632R							Low	26	35	44
De Luz	DLZ	NE	29	18	29	520-18R, 520-26R						23030	High	27	33	36
Eucalyptus Hills	EUC	EA	29	15	29	240, 248, 396-699R, 1138						636	High	22	30	
Pauma	PMA	NE	29	20	29	217-837R, 908-30, PY1							Medium	22	30	44
Crest	CST	EA	28	23	28	411-47R							Medium	24	31	36
Fallbrook	FBK	NE	28	25	28	230-4R, 239-15R, 1234						698	High	27	34	46
Los Coches	COC	EA	28	22	28	243, 246, 247						678, 6914	Low	23	31	42
Mission Trails	MTL	BC	28	25	28	280, 308-563AE							N/A	27	40	52
Mt Palomar	PAM	NE	28	22	28	214-583R, CTL1							High	23	30	42
Tecolote Canyon	TCN	BC	28	15	28	276, 492							Low	19	29	42
Turner Lake	TLK	NE	28	25	28	351-871R, 353-904R, 1021							High	24	30	37
West Alpine	WAL	EA	28	26	28	355, 356-16R, 357-50R						678	Medium	27	32	40
Alpine	ANE	EA	27	24	27	355, 357							Medium	23	30	35
Camp Elliot	MPE	BC	24	27	27	252, 776							Low	21	28	38
Carvacre	CRV	EA	24	27	27	1166-18R						625, 6957,	Medium	24	30	41
Hidden Meadows	HMD	NE	24	27	27	351, 353-904R							High	23	30	36
La Jolla Heights	LJH	BC	27	15	27	59, 64, 65, 69, 114, 120, 1085							N/A	21	29	39
Pauma Valley	PAU	NE	27	20	27	217-835R, 249							Medium	24	31	37
Rainbow Heights	RBH	NE	27	24	27	1233-252R, 1233-259R, RB1-30R						23030	Medium	23	30	44
Rainbow Valley	RBV	NE	27	24	27	239-15R, 521-14R, 521-18R, RB1-30R							Medium	22	28	33
Ranchita	RCH	RA	24	27	27	211-279R							Medium	25	32	40
Jamul	JAM	EA	26	21	26	75-996R, 524-22R							High	21	27	33
Ammo Dump	AMO	NC	25	21	25	300, 231							High	23	29	40
Avocado	AVO	NE	25	20	25	520-22R, 521-14R, 521-32R							High	22	28	39
Blossom Valley	BVY	EA	25	20	25	240-1095R, 246-34R, 247-47, 356-19R							High	21	27	35
Cole Grade	CGD	NE	23	25	25	215-38R, 908-1172R						683	Medium	23	29	40
El Monte Road	ELM	EA	25	20	25	240, 248						635	Medium	21	28	34
Harbison Canyon	HAR	EA	23	25	25	356-30AE						678	Medium	22	27	35
Lawson Valley	LSV	EA	23	25	25	157-81R, 524-27R							Medium	22	27	33
Lilac	LLC	NE	23	25	25	350-41R, 352-27R, 1022-24R, 1022-26R						683	High	22	28	38
Linea Del Cielo	LDC	NC	25	18	25	66-1213R, 305						674	High	27	33	
Mission Valley North	MVN	BC	25	18	25	145, 146, 362, 703, 706, 707, 715							N/A	17	26	39
Poway	POW	NE	23	25	25	175-24R, 178, 476							N/A	22	28	34
San Clemente Ridge	SCR	OC	23	25	25	200, 204, 329, 331							Medium	24	32	35
Valley Center	VLC	NE	25	20	25	907-1602, 907-1716R, 908-1201R, 909-17R, 1030-23R						681, 6926	High	22	27	35
Bell Canyon	CAP	OC	22	24	24	1243-45R							Medium	21	26	33
Borrego	BRG	NE	22	24	24	170, 171, 172							N/A	24	29	36
Chula Vista	CVX	CM	22	24	24	463, 1180							N/A	21	25	33
Imperial Valley	IMP	ME	22	24	24	NULL							N/A	23	29	41
Mt Soledad	MSD	BC	24	18	24	57, 59, 114, 578, BK1							N/A	17	25	39
Otay	OTY	EA	22	24	24	75-996R							Medium	23	30	33
Rancho Penasquitos	RPQ	NE	22	24	24	500-1531, 502-717							Low	22	26	32
Circle R	CIR	NE	23	19	23	350-15R, 354-38R							High	19	24	33
San Miguel	MIG	CM	23	15	23	591-1129R							Low	26	33	40
San Vicente	SVC	EA	22	18	22	240, 248						23054, 230	Low	18	24	31
Sycamore Canyon	SYC	BC	22	18	22	728-689AE, 920-813R						6917, 2305	Low	27	34	46
Twin Oaks	TWO	NE	22	20	22	205-369R, 206-953R, 599-19R, 859-42R, 1094-7							High	18	23	27
National City	NAT	CM	21	15	21	NULL							N/A	17	25	26
El Cajon	ECJ	EA	20	13	20	N/A							N/A	17	23	31
Rios Canyon	RIO	EA	20	15	20	243, 246, 247						678	Low	19	24	32
San Marcos	SMC	NE	20	18	20	182, 185, 294, 296, 297, 298, 299, 596, 597, 599							Medium	22	25	32
Keyes Creek	KCK	NE	18	19	19	350-684R, 908-30							Medium	15	21	30
Mt Laguna	MLG	ME	17	19	19	440-13R							High	18	23	29
Chollas Lake	CHO	CM	17	15	17	167-32F							N/A	17	24	28
Narrows Sub	NRW	NE	15	15	15	N/A							N/A	21	25	46
Vista	VIS	NC	15	12	15	855							N/A	15	18	26

Updated Circuit Forecast - 10_30-31_19

Tab: Full List - Oct 30-31

Station Name	Station	Coc District	Wed	Gust	F	Thu	Gust	F	Event Max	Sectionalizing Device	Tielines	VRI	CLIMO 95th	CLIMO 99th	CLIMO Max
Sill Hill	SIL	ME	74	81	81	79-799R					626	Medium	60	81	101
Boulder Creek	BOC	ME	56	61	61	79-799R					626	Medium	44	57	72
North Boulder Creek	NBC	EA	56	61	61	79-799R, 238					626	Medium	42	53	69
Hellhole Canyon	HHC	NE	54	60	60	1030-987						Low	50	62	82
Buckman Springs	BMS	ME	51	58	58	441-25R					629	Medium	42	55	87
Crestwood	CWD	ME	57	53	57	445-23R, 1215-12R					6931, 629,	Low	47	58	76
Sherilton Valley	SHV	ME	51	56	56	79-673R						Low	42	54	65
East Willows Road	EWR	EA	51	56	56	358-682F						Low	46	60	72
Lucky Five Ranch	LFR	ME	51	56	56	79-685R						Medium	44	57	69
West Santa Ysabel	WSY	RA	50	54	54	222-1370R					637	Low	42	52	75
Inaja Park	IJP	NE	50	54	54	222-1364R					626	Medium	43	53	66
North Descanso	NDC	ME	47	53	53	79-679R					626	Low	43	52	69
Viejas Grade	VGD	EA	48	53	53	78-26R						Low	40	53	77
Dye Mountain	DYE	NE	47	53	53	222-1370R					637	Low	42	54	63
La Posta	LPT	ME	49	53	53	441-23R, 1215-12R					629, 6958,	Low	45	54	69
Hoskings Ranch	HOS	RA	47	52	52	222-1364R						Medium	40	52	63
Rancho Heights	RHS	NE	52	44	52	217-983R						Low	34	50	64
Round Potrero	RPO	ME	50	46	50	157-75R					6923, 5000	Low	40	50	65
School House Canyon	SHC	RA	50	44	50	220-294R						Low	44	53	66
Santa Ysabel Ranch	SYR	RA	45	49	49	220-288R					685	Low	39	49	64
Otay Mountain	OTM	EA	45	49	49	75-1744R						Low	41	52	64
Potrero	POT	ME	49	44	49	157-84R, 448-23R						Low	37	46	60
North Potrero	NPT	ME	48	44	48	157-84R, 448-23R						Low	38	46	55
Cuca Ranch	CCR	NE	48	38	48	214-1122R					682	Medium	33	46	61
Poomacha	POM	NE	41	47	47	214-1122R					682	Medium	37	47	56
Tierra Del Sol	TDS	ME	43	47	47	445-24R						Medium	37	44	54
Maderas	MAD	NE	47	42	47	175-24R					634	Low	29	36	
Pacific Crest Trail	PCT	EA	45	47	47	448-33R					50001	Medium	34	42	
Anderson Valley	AVY	EA	41	47	47	357-1299R						Low	36	48	56
Witch Creek	WCK	RA	42	47	47	222-1370R, 237-30R						Low	39	49	62
Mesa Grande	MGD	RA	47	43	47	220-298R						Medium	36	47	54
Pine Valley	PIV	ME	41	46	46	440-13R, 442-14R (opens 79-658R)						Medium	33	42	57
Shockey Truck Trail	STT	ME	41	46	46	448-11R						Medium	37	46	61
Volcan Mountain	VCN	RA	43	46	46	221-19R						Low	40	50	60
Santa Teresa Valley	STV	RA	42	46	46	222-1370R, 237-30R						Medium	36	47	54
Mataguay	MGY	RA	41	45	45	212-638R, 212-734R, 212					685	Medium	36	44	52
Sunrise Highway	SRH	ME	41	45	45	440-13R, 442-14R					629	Medium	33	45	69
High Valley	HVL	NE	45	42	45	176-58R						Low	29	36	
Harrison Park	HRP	RA	41	45	45	222-7R						Medium	36	48	57
Rockwood	ROC	NE	45	45	45	1030-989R						Medium	37	47	56
West Wynola	WWY	RA	41	45	45	221-31R, 222-1364R, JU1, OK1, PE1, SL1						Medium	36	46	56
Chihuahu Valley	CHH	RA	45	37	45	212-652R						Low	32	41	50
Laguna	LAG	ME	40	44	44	440-13R						High	35	44	56
West Descanso	WDC	ME	40	44	44	73-643R, 73					625	Low	33	42	62
Lake Cuyamaca	LCN	ME	40	44	44	79-658R						Medium	34	42	53
Sweetwater River	SWR	EA	40	44	44	73-643R, 73					625	Medium	33	42	55
Wynola	WYN	RA	40	44	44	221-23R, 221-344R						Medium	39	45	54
Sunset Oaks	SSO	RA	44	40	44	237-30R						Medium	36	44	53
Talega	TLG	OC	44	35	44	N/A						N/A	32	39	51
Barrett Junction	BRJ	ME	43	39	43	157-87R					50001	Medium	37	43	53
Hodges Dam	HDM	NE	43	30	43	1100, 1105-1479						Low	36	46	54
Santa Ysabel North	YSN	RA	38	42	42	220-288R, 221-19R, 221-31R, 222-1364R, 222-1370R, JU1, PE1					626, 685	Low	33	41	52
Blue Sky	BLU	NE	42	42	42	327					634	Low	27	34	
Crestline	CLN	NE	42	39	42	214-583R, CTL1-3R						High	34	45	54
Viejas	VJS	ME	42	38	42	78-26R, 358-585R, 1458-519						Medium	34	43	58
Rincon Central	RCE	NE	42	36	42	216-220R, 909-17R					6926	Medium	36	45	47
Warners	WAR	RA	39	41	41	210-172R, 211-279R, 212-638R, 212-734R, 212					682	Medium	35	41	52
Boulevard West	BVD	ME	38	41	41	444-43R, 445-39R					6931, 5000	Medium	34	42	57
Campo	CPO	ME	37	41	41	448-13R					50001	Medium	34	42	55
East Warners	EWN	RA	40	41	41	211-279R						Medium	37	43	54
Japatul Valley Road	JVR	ME	37	41	41	73-765R, 1166-18R					625	Medium	33	42	52
West Potrero	WPT	ME	36	41	41	157-75R, 448-23R						Medium	35	42	50
White Star	WST	ME	41	41	41	445-21R						Medium	37	44	
Guejito Ranch	GUR	NE	41	38	41	1030-989R						Medium	32	37	49
Sequan Truck Trail	SQT	EA	41	37	41	283-55R, 1166-15R, 1166-18R, DV1					625, 6957	Medium	35	43	53
Ortega	ORT	OC	41	35	41	1243-45R						Low	33	39	50
Loveland	LLD	EA	41	35	41	283, 357, 1166, DV1					6904, 6914	Medium	33	44	50
Nate Harrison Grade	NHG	NE	41	27	41	217-837R						Medium	26	37	62
Elfin Forest	ELF	NC	41	30	41	597-592, 1001-1140, 1118-1F						Medium	29	36	
Olivenhain	OLV	NE	41	30	41	182-2240, 1250						Medium	36	44	54
Iron Mountain Trail	IMT	NE	40	40	40	176-58R						Low	29	36	
Pamo Valley	POV	RA	33	40	40	237-2R						Low	31	43	63
Viejas Mtn Trail	VMT	NE	36	40	40	357-1147R						N/A	31	44	49
Goose Valley	GOS	RA	40	38	40	237-2R						Medium	32	40	50
Fruitvale	FTV	NE	40	36	40	215-38R						Medium	32	40	53
Paradise Mountain	PMT	NE	40	36	40	1030-18R						Medium	30	40	43
Rincon Reservation	RCR	NE	40	36	40	909-17R						Medium	32	39	56
Victoria	VIC	EA	40	34	40	357-1147R, 1458-454						Medium	30	41	48
Escondido	ESC	NE	39	30	39	450-50R, 452-38AE, 454-47R, 907-1716R					681	Medium	26	33	41
Pauma Creek	PCK	NE	39	20	39	217-837R, PY1						Medium	29	38	49
Julian	JUL	RA	33	36	36	221-31R, 222-1364R, JU1, OK1, SL1						High	30	37	44
Pine Hills	PIH	RA	33	36	36	222-1364R, PE1						High	30	38	53
Highland Valley	HVY	RA	36	33	36	176-26R, 971-26R, 972-30R, 972-26R						High	29	38	41
Mussey Grade	MGR	RA	36	22	36	971-26R, MOR1					6917	Medium	26	35	49
Ramona	RAM	RA	35	29	35	236-10R						High	30	36	48
Creelman	CLM	RA	33	25	33	971-29R, 973-630R, 974-35R					635, 6917	High	30	36	50
Hideaway Lake	HID	NE	32	25	32	907-1602, 907-1716R, 908-1236R, 1021, 1022-17F						High	28	35	45
Cristianitos	CRI	OC	31	20	31	338-6R, 339-478R, 339-480R					23030	Low	24	30	39
Rancho Santa Fe	RSF	NC	30	18	30	305-32R, 307-1492R, 1001-1130, 5F3-19R						High	24	30	37

**“Updated Filtered Preliminary Circuit Forecast -
10_21_2019.xlsx”**

Updated Filtered Preliminary Circuit Forecast - 10_21_2019

Tab: Preliminary Circuit Forecast fo

Station Name	Station Code	District	Gust Forecast (mph)	Sectionalizing Devices	Circuits	Tielines
Sill Hill	SIL	ME	52	79-799R	79	626
Hellhole Canyon	HHC	NE	44	1030-987	1030	
Crestwood	CWD	ME	43	445-23R, 1215-12R	445, 1215	6931, 629, 6958
Boulder Creek	BOC	ME	42	79-799R	79	626
La Posta	LPT	ME	42	441-23R, 1215-12R	441, 1215	629, 6958, 50003
North Descanso	NDC	ME	42	79-679R	79	626
North Boulder Creek	NBC	EA	41	79-799R, 238	79, 238	626
East Willows Road	EWR	EA	40	358-682F	358	
Sherilton Valley	SHV	ME	40	79-673R	79	
Buckman Springs	BMS	ME	40	441-25R	441	629

Updated Filtered Preliminary Circuit Forecast - 10_21_2019

Tab: Preliminary Circuit Forecast fo

Station Name	Ramp-Up Time	Peak Time	VRI	CLIMO 95th	CLIMO 99th	CLIMO Max	
Sill Hill	Early Morning	Early Morning	Medium	60	81	101	
Hellhole Canyon	Morning	Morning	Low	50	62	82	
Crestwood	Morning	Morning	Low	47	58	76	
Boulder Creek	Early Morning	Early Morning	Medium	44	57	72	
La Posta	Early Morning	Early Morning	Low	45	54	69	
North Descanso	Early Morning	Early Morning	Low	43	52	69	
North Boulder Creek	Early Morning	Early Morning	Medium	42	53	69	
East Willows Road	Morning	Morning	Low	46	60	72	
Sherilton Valley	Early Morning	Early Morning	Low	42	54	65	
Buckman Springs	Early Morning	Early Morning	Medium	42	55	87	