

PacifiCorp 2020 Wildfire Mitigation and Public Safety Power Shutoff (PSPS) Preparation

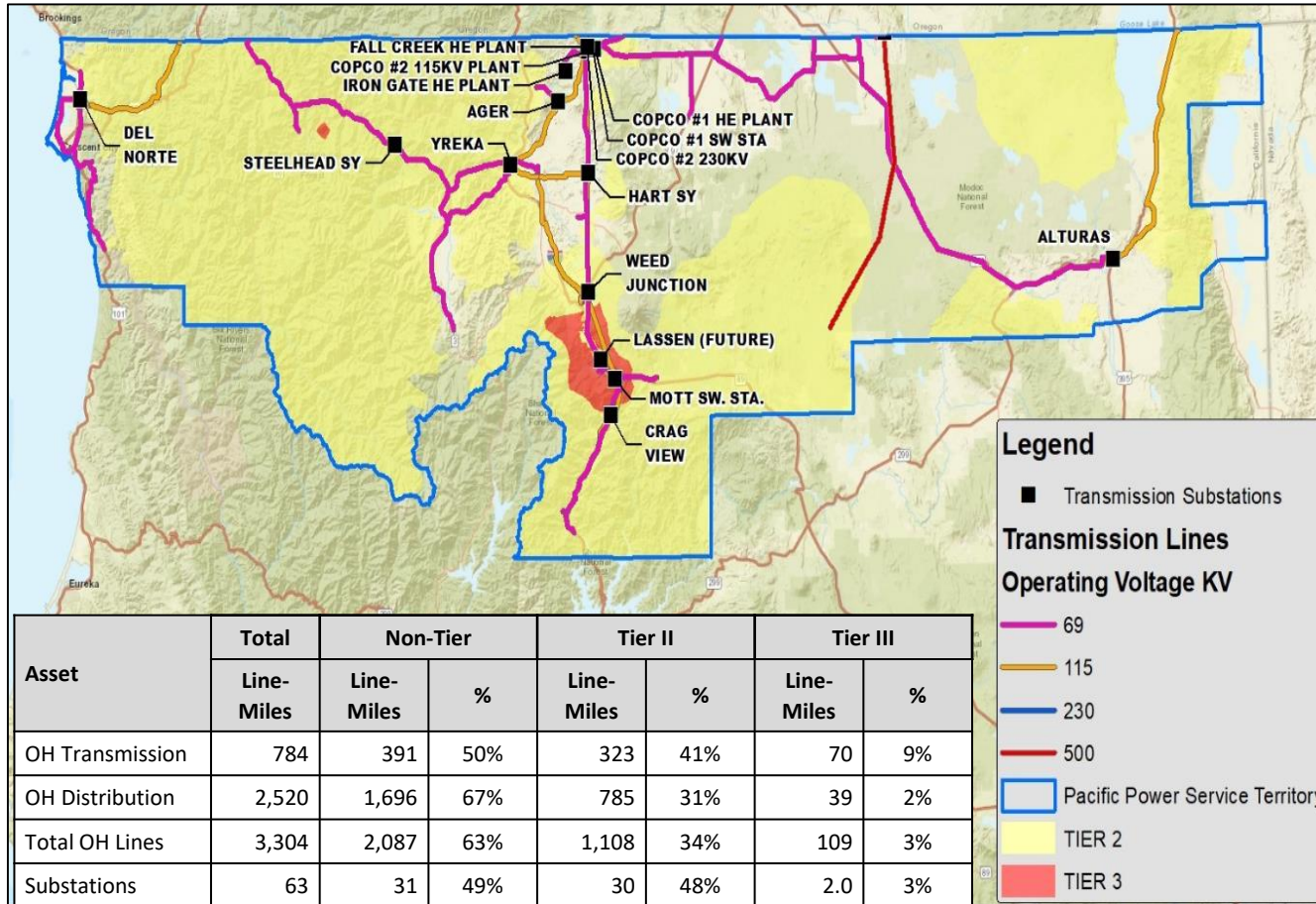
May 2020



Overview

- PacifiCorp's California Service Territory
- 2020 Fire Season Outlook and Preparation
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PacifiCorp's California Service Territory



PacifiCorp provides electricity to approximately **45,000 customers** via **63 substations** and **2,520 miles** of distribution lines and about **800 miles** of transmission lines across nearly **11,000 square miles** of which just under half is classified as HFTD

2020 Fire Season Outlook

- Generally fire season spans for PacifiCorp from Memorial Day through late September, while PSPS risk periods tend to occur starting in August, depending on how severe long term drying has been.
- Fire season across the Western United States increased by nearly six weeks over a 20 year span (1992 – 2012).
- Mega Fires (more than 100,000 acres) increased threefold in the last 10 years.
- Areas within our service territory are some of the most wildfire prone states in the United States and has experienced an upward trend of wildfire size over the past 50 years.
- Areas of greatest potential loss from wildfire are located in the Wildland Urban Interface (WUI) that continues to expand with California's growing population.
- Trends in acres burned by wildfire are projected to increase in California as temperatures warm and incidence of drought increases.
- 2020-long term fire forecast predicts an above normal significant fire potential this fire season for Northern California



Preparation for Fire Season

- Situational Awareness
 - Calibrated weather station
 - Daily forecasting resumed on May 15, 2020
- Operational Practices
 - Wildfire refresher training conducted with field employees
 - “No test-energize” policy in place on red flag warning days
- System Hardening
 - Inspections
 - Vegetation management, including pre-season inspections of off cycle circuits
 - First round of relay/recloser upgrades are nearing completion
 - Beginning first reconductoring project in mid-summer (expected to be commissioned just prior to PSPS-risk period)
- PSPS Threshold Refinements
 - Incorporates more granular local information to advise actions
- Customer-facing tool development
 - The company’s customer-facing PSPS website,¹ customer and public safety partner communications²

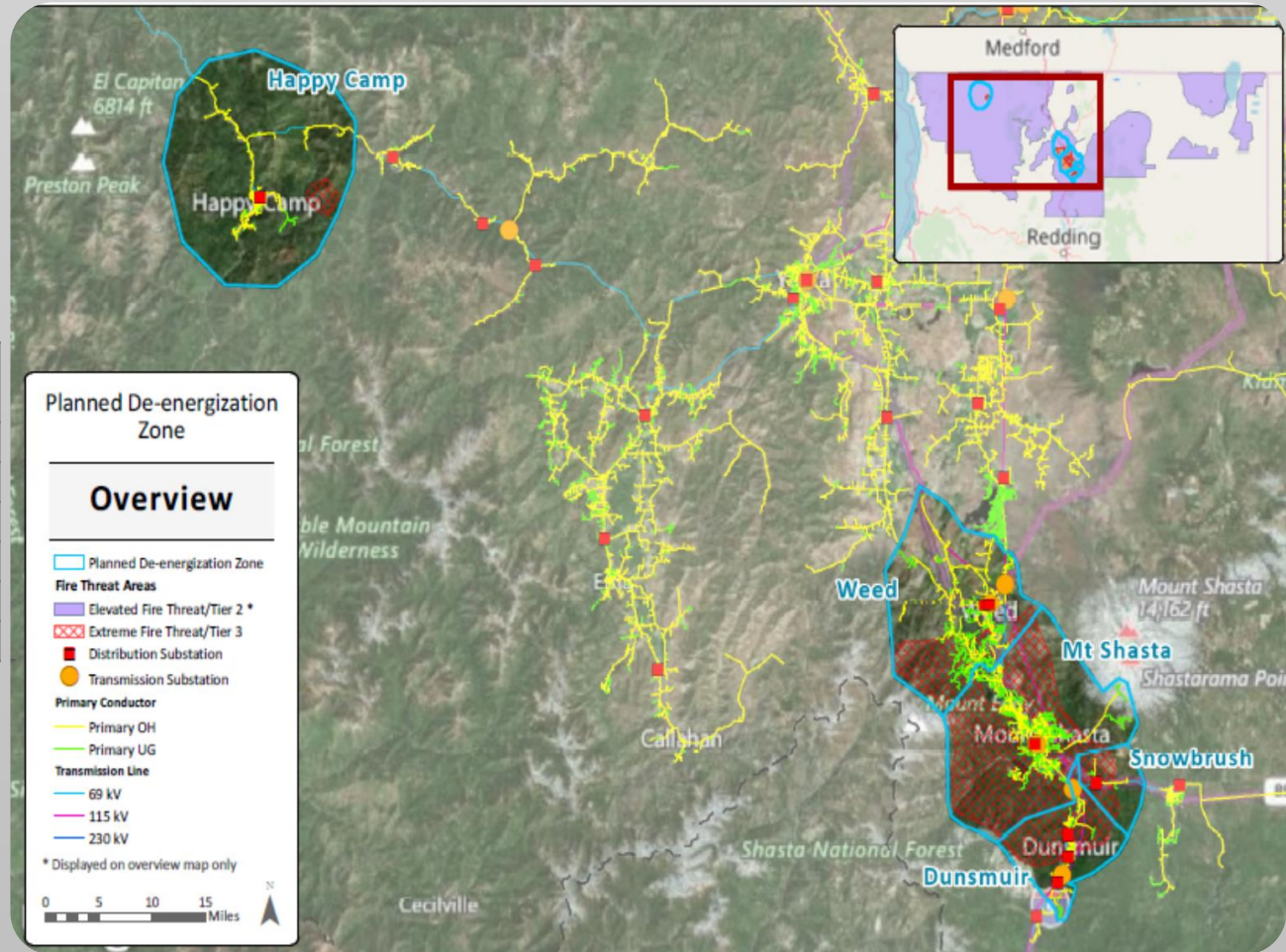
¹ <https://www.pacificpower.net/outages-safety/wildfire-safety/public-safety-power-shutoff.html>

² <https://www.pacificpower.net/outages-safety/wildfire-safety.html>

Public Safety Power Shutoff Overview

PacifiCorp's plan for proactive de-energization is currently limited to Tier 3 areas, which are the extreme risk areas.

	PDZ Name	Circuits	Customers
1	Happy Camp	3	865
2	Weed	5	2,589
3	Mt. Shasta	6	5,074
4	Dunsmuir	5	1,806
5	Snowbrush	1	17
	Total	20	10,351



PacifiCorp's Proactive De-energization Approach

- PacifiCorp developed an operating procedure that documents the process for a proactive de-energization event.
 1. PacifiCorp utilizes automated weather systems monitoring to generate an internal notification based on the watch criteria, and a potential PSPS activation is triggered.
 2. When a potential activation is triggered a Public Safety Power Shutoff Event Proposal is prepared and provided to the Vice President of System Operations and the Vice President of T&D Operations which contains the timing details, area, and forecasted duration of the event.
 3. The Vice President of System Operations and the Vice President of T&D Operations evaluate all relevant information as described in the company's 2020 WMP, including input from public safety partners to properly characterize and consider impacts to local communities.
 4. The Vice President of System Operations and the Vice President of T&D Operations decide whether to implement a PSPS event.
 5. If activated, the company's notification and activation protocols are followed, including activation of the company's emergency management system and customer/public notifications.
 - Customer Service for customer notification (48 hours notice is desired)
 - Emergency Management for local emergency services notification
 - Regulation for notification to the director of the CPUC safety and enforcement division (SED).
 - Local Operations for required switching / line patrolling
 - Regional Business Manager for preparation of customer care centers and large customer contact
 6. Conditions are continuously monitored during the PSPS event and when elevated risk conditions no longer exist, lines are patrolled for damage, and re-energized, ending the PSPS event.

As experience with proactive de-energization is gained, the company expects to evolve the plan incorporating lessons learned to improve the process.

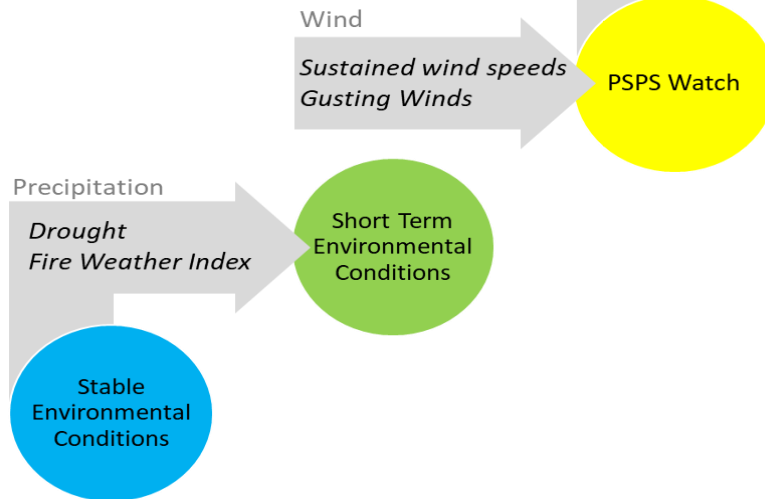
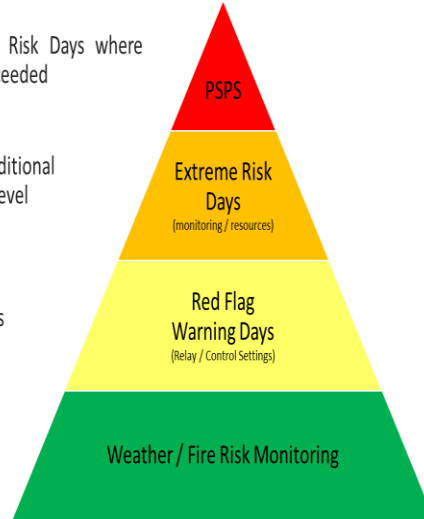
Public Safety Power Shutoff Walkthrough

Public Safety Power Shutoff (PSPS) during Extreme Risk Days where thresholds for wind and low precipitation have been exceeded

During Extreme Risk Days, in identified areas, deploy additional resources to area for assessment/monitoring at a local level

Utilization of protection and control settings during Red Flag Warning Days, which require additional field patrols before re-energizing lines after a fault event

Implementation of weather monitoring and weather forecasting in localized areas, including installation of weather monitoring stations



Additional Criteria

- *Environmental*
- *Locational*
- *Situational*



Pacific Power
Emergency
Operation
Center (EOC)
Active

While mainly elevated through environmental conditions (Precipitation and wind); the decision to implement PSPS considers additional criteria:

Environmental

- ✓ Recent precipitation
- ✓ Wind directionality
- ✓ Recent fire activity throughout service territory

Locational

- ✓ Alternative ways to re-route power to affected areas
- ✓ Impacts on mandatory or voluntary evacuation orders in place (ingress / egress routes)

Situational

- ✓ Real-time situational awareness information from personnel positioned in the impacted areas identified as potentially at risk
- ✓ Current fire activity throughout service territory
- ✓ Input from local emergency services and response authorities

Proactive De-Energization: PDZ Event Criteria

- PacifiCorp uses the following measurements as inputs to the PSPS watch criteria:
 - Hourly Fosberg Fire Weather Index (FFWI) which uses temperature, relative humidity, 10-minute wind-speed factored into a single weather index which is correlated to influence on fire spread, accumulated over a 6 hour period (FFWI6).
 - The Keetch-Byram Drought Index (KBDI) which assesses the risk of fire by representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency.
 - Forecasted wind speeds and potential sustained gusts.
- An automatic notification is triggered internally for specific PSPS areas based on a forecast of the above measurements meeting the following levels:

PSPS Watch Level 1	PSPS Watch Level 2
<ul style="list-style-type: none"> • KBDI ≥ 622 <u>and</u> • FFWI6 ≥ 30 <u>and</u> • Sustained wind ≥ 16 mph <u>or</u> Wind gust ≥ 25 mph 	<ul style="list-style-type: none"> • KBDI ≥ 622 <u>and</u> • FFWI6 ≥ 30 <u>and</u> • Wind gust > 31 mph

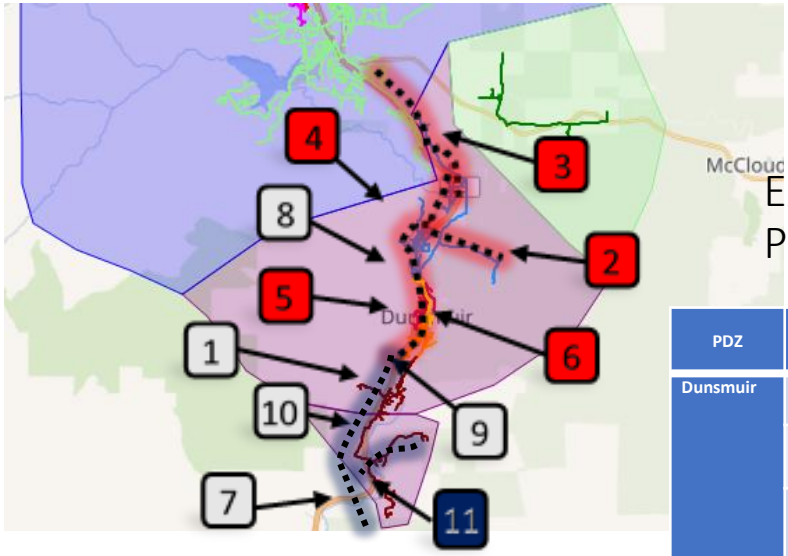
- Localized criteria such as up to date or real time weather and community information are incorporated when a determination is made to implement an actual PSPS event as described in the company's 2020 WMP.
- Coordination and dynamic planning with public sector entities, other private companies and the company informs the decision-making process.
- *PacifiCorp is also evaluating how to layer more localized weather and vegetation data into its PSPS assessment process*

Public Safety Power Shutoff Long-Term Vision

PacifiCorp has substantial work it plans to deliver to limit the impacts, both short- and long-term, for mitigating the impacts of PSPS

- PacifiCorp has a significant amount of system hardening underway which will limit the need for customers to experience PSPS events in the future.
- Long term, the company is working to remove as many customers as is reasonable from PSPS operations.
- Slide 10 shows an example area in which the hardened system would benefit about 1,800 customers served.
- These plans have been developed for all areas that are currently part of the company's PSPS plans.
- As work is delivered and systems are hardened, these plans, equipment and customer lists are updated.

Impacts of Asset Hardening on PSPS-affected Customers



Example of Asset Hardening and Impact on PSPS Minimization

Dunsmuir area PDZ
 After completion of all steps,
 reduces impact to
 approximately 1,800 customers.

As work is completed, a large
 number of customers will not
 be likely to be involved in PSPS.

PDZ	Ref #	Construction Activity	Priority/Planned Completion Date
Dunsmuir	1	Install Weather Station will provide greater detail of weather conditions in and around the greater Dunsmuir area.	2019
	2	Rebuild 1.4 miles to covered conductor, re-conductoring the single phase portion of circuit 5G69 up the hill to a radio tower. There are no taps on this line.	1
	3	Rebuild 7.6 miles to covered conductor, re-conductoring and converting the two phase portion of 5G69 between 5G79 and Dunsmuir Substation to three phase. This is a transmission underbuild project and overhead taps are also to be re-conductored.	1
	4	Rebuild 3.9 miles to covered conductor, re-conductoring the remainder of 5G69 overhead portions serving the Shasta Retreat area out of North Dunsmuir Substation.	1
	5	Rebuild 6.0 miles to covered conductor, re-conductoring the overhead portions of circuits 7G71 and 7G73 out of North Dunsmuir Substation. The two circuits will be constructed at 15kV but remain energized at 4.16kV.	1
	6	Rebuild 3.5 miles to covered conductor, re-conductoring the entirety of the overhead portions of circuits 7G75 out of South Dunsmuir Substation. This circuit will be constructed at 15kV but remain energized at 4.16kV.	1
	7	Rebuild 8.4 miles to covered conductor, re-conductoring the overhead portions of 8G95 out of Nutglade Substation, however timing and necessity are expected to be informed by continuing analysis of fire and weather risks.	6
	8	Replace recloser using SEL 651 capable of remote reconfiguration (communications required). Configured with fire settings (which allow for four setting profiles, in addition to high impedance fault detection capabilities) and will be remotely communicable.	2020
	9	Substation Relay Replacement at North Dunsmuir Substation (5G69, 7G71, 7G73). Replace Relays with SEL 751s & DFA (distribution fault anticipation technology).	2020
	10	Substation Breaker and Relay Replacement at South Dunsmuir Substation (7G75). Replace Relays with SEL 751s & DFA (distribution fault anticipation technology).	2020
	11	Substation Breaker and Relay Replacement at Nutglade Substation (8G95). Replace Relays with SEL 751s & DFA (distribution fault anticipation technology).	2020
	Mitigated PDZ		

Situational Awareness to Inform PSPS Actions

WESTERN WEATHER GROUP PacifiCorp CA Weather PACIFICORP

Monday October 28, 2019 Issued 9:00 am

Cautionary Notes/Highlights: Winds weaken today as the weekend's trough quickly exits the region. Another trough will dig south over the Great Basin on Tuesday and enhance north winds again with more of NE'erly pressure gradient.

HAPPY CAMP/SEAD VALLEY EXTENDED FORECAST

Day	Avg KBDI	Max FFWi6	Wind Spd	Wind Gust	Wind Dir	Max Temp	Min RH
Thursday	370	8	3	10	E	66	12%
Friday	373	8	3	9	NE-E	71	20%
Saturday	376	8	3	9	E-W	73	20%
Sunday	379	7	3	9	E-W	75	30%

Extended Forecast Synopsis:
A broad ridge of high pressure shifts a little further inland on Thursday and appears to linger around through the weekend. This should continue to deflect storm activity to the north for the time being and keep warm, dry and relatively calm conditions in place.

MT. SHASTA AREA EXTENDED FORECAST

Day	Avg KBDI	Max FFWi6	Wind Spd	Wind Gust	Wind Dir	Max Temp	Min RH
Thursday	499	5	5	19	E-NW	61	12%
Friday	501	5	5	19	E-NW	68	18%
Saturday	506	5	5	13	Var	70	19%
Sunday	506	5	5	13	Var	70	27%

Meteorologist, Will Farr

SHORT TERM FORECAST

TODAY

	KBDI	FFWi6	Wind Spd	Wind Gust	Wind Dir	Max Temp	Min RH	Synopsis:
Happy Camp	360	8	3	12	NE-E	55	13%	Winds weaken today and temperatures warm up a few degrees. A dry air mass remains in place.
Weed	493	13	5	15	SE-N	59	15%	
Mt. Shasta	559	18	7	16	NW-NE	58	16%	
Dunsmuir	531	14	5	13	N-NE	63	12%	
Snowbrush	436	8	3	9	NW-NE	55	16%	

TONIGHT

	Wind Spd	Wind Gust	Wind Dir	Min Temp	Min RH	Synopsis:	
Happy Camp	--	--	2	6	E-NE	25-29	55%
Mt. Shasta Area	--	--	6	14	N-NE	22-32	40%

Tuesday

	KBDI	FFWi6	Wind Spd	Wind Gust	Wind Dir	Max Temp	Min RH	Synopsis:
Happy Camp	363	32	14	32	NE-E	56	10%	A trough diving out of Canada will retrograde into the Great Basin. This could enhance winds to the NE'erly. If this is the case winds will be periodically windy at places favored by NE'erly winds (i.e. Happy Camp, Weed & Dunsmuir).
Weed	495	35	15	31	NE-NW	50	10%	
Mt. Shasta	560	23	9	23	NE-NW	54	10%	
Dunsmuir	533	24	9	23	NE-NW	54	10%	
Snowbrush	439	17	7	20	NE-NW	54	10%	

Tuesday Night

	Wind Spd	Wind Gust	Wind Dir	Min Temp	Min RH	Synopsis:	
Happy Camp	--	--	4	11	NE-E	23-27	35%
Mt. Shasta Area	--	--	9	20	N-NE	22-29	30%

Wednesday

	KBDI	FFWi6	Wind Spd	Wind Gust	Wind Dir	Max Temp	Min RH	Synopsis:
Happy Camp	366	17	6	15	NE-E	63	10%	The general wind pattern turns more easterly, which may cause winds to vary between NE and SE around Mt. Shasta. Otherwise, winds should lighten and temperatures should warm up several degrees.
Weed	497	23	8	18	NE-SE	56	8%	
Mt. Shasta	562	23	8	19	NE-SE	56	9%	
Dunsmuir	535	18	6	16	NE-N	61	7%	
Snowbrush	442	11	4	14	NE-SE	52	11%	

/ Day	Happy Camp		Weed		Mt. Shasta		Dunsmuir		Snowbrush	
	KBDI	FFWi6	KBDI	FFWi6	KBDI	FFWi6	KBDI	FFWi6	KBDI	FFWi6
TODAY	360	8	493	13	559	18	531	14	436	14
Tuesday	363	32	495	35	560	23	533	24	439	17
Wednesday	366	17	497	23	562	23	535	18	442	11
Thursday	370	8			439				19	
Friday	373	8			501				13	
Saturday	376	8			504				10	
Sunday	379	7			506				9	
	AVG KBDI					AVG FFWi6				

PacifiCorp Weather Station Network

Daily Meteorological Summary
Sunday, October 27, 2019

	Temperature		Rain		RH	Dew Pt	Fire Indices		WIND		Fuels				
	Max	Time	Min	Time			Avg	FFWMax	KBDI	Avg	Gust	Max	Avg		
Dunsmuir	53.4	15:27	31.9	01:01	0.00	2.40	21	17.1	11	529	4.8	27.1	NNW	68.3	0.7
Lake Siskiyou	51.6	16:27	25.8	00:58	0.00	1.61	22	16.7	4	357	1.3	18.4	WSW	-	-
Snowbrush	45.9	15:43	21.9	07:01	0.00	2.51	29	12.8	4	434	1.7	12.2	W	85.5	8.4
Pollard Flat	59.0	16:20	42.2	00:00	0.00	2.35	16	16.7	26	530	7.7	33.2	NNE	87.8	4.9
North Mt Shasta City	48.3	16:46	24.9	00:59	0.00	1.91	22	14.0	14	524	5.3	22.4	WNW	-	-
SW Weed	50.7	16:17	24.2	00:25	0.00	2.91	21	15.2	9	416	5.0	20.0	NW	73.6	0.6
West Weed	49.4	16:09	27.7	05:49	0.00	3.01	21	15.3	6	430	1.8	15.2	N	-	-
North Weed	52.2	15:20	25.0	00:17	0.00	1.77	17	14.4	25	491	11.2	33.3	N	-	-
Seiad	59.5	16:14	32.8	00:59	0.00	3.60	18	23.2	5	334	2.6	26.7	SW	80.4	8.2
Happy Camp	60.5	16:05	33.4	00:55	0.00	3.34	15	19.8	22	357	8.2	31.9	NNE	-	-

*Please email forecaster@westernwx.com by noon on Friday to request weekend forecasting

Granular Details when in PSPS Alert

Station	Alert Start	Alert End	Wind Dir	Sustained Wind Speed					Max Wind Gusts					Dir
				10-14 mph	15-19 mph	20-24 mph	25-29 mph	30-34 mph	35-39 mph	40-44 mph	45-49 mph	50-54 mph	55+ mph	
Happy Camp	10/28/19 3:00 PM	10/28/19 6:00 PM	E	x	x	x	x	x	x	x	x	x	x	NW
Weed	10/28/19 3:00 AM	10/28/19 6:00 AM	E	x	x	x	x	x	x	x	x	x	x	NW
Mt. Shasta	10/29/19 3:00 AM	10/29/19 6:00 AM	E	x	x	x	x	x	x	x	x	x	x	NW
Dunsmuir	10/29/19 9:00 AM	10/29/19 12:00 PM	E	x	x	x	x	x	x	x	x	x	x	NW-NE
Snowbrush	10/29/19 3:00 PM	10/29/19 6:00 PM	E	x	x	x	x	x	x	x	x	x	x	NW-NE
Happy Camp	10/30/19 12:00 AM	10/30/19 3:00 AM	E	x	x	x	x	x	x	x	x	x	x	NW-NE
Weed	10/30/19 3:00 AM	10/30/19 6:00 AM	E	x	x	x	x	x	x	x	x	x	x	S-SE
Mt. Shasta	10/30/19 6:00 AM	10/30/19 9:00 AM	E	x	x	x	x	x	x	x	x	x	x	S-SE

Customer Communication Efforts

Customer Communication Wildfire Mitigation and Safety

- ✓ Advertising
 - Print
 - Radio
 - Digital
 - Social
- ✓ Media outreach
- ✓ Bill insert
- ✓ Bill message
- ✓ Webinar
- ✓ Informational sheets
- ✓ Resource center on website



Customer Communication Tools

MY ACCOUNT OUTAGES & SAFETY SAVINGS & ENERGY CHOICES Q ☎ 📍 SIGN IN

Safety and preparedness resources

Use these safety and preparedness resources to guide your emergency plans, improve your home safety and prepare for wildfires, storms and other disasters.

Health

- Home use medical devices: How to prepare for and handle power outages - U.S. Food and Drug Administration (FDA)
- Checklist: Emergency power planning for people who use electricity and battery dependent assistive technology and medical devices - Pacific ADA Center
- Power outage during extreme heat - Centers for Disease Control and Prevention
- Tips for preventing heat-related illness - Centers for Disease Control and Prevention
- Food and water safety during a power outage - U.S. Food & Drug Administration

Personal and home preparedness guides

- Building an emergency kit - Ready.gov
- Making an emergency plan - Ready.gov
- [VIDEO] How to make your home and property fire-safe - Oregon Department of Forestry and Keep

Interactive PSPS map

Public safety power shutoff forecasting

This table shows the Public Safety Power Shutoff status.

NAME	TODAY	TOMORROW	2 DAYS OUT	3 DAYS OUT	4 DAYS OUT	5 DAYS OUT	6 DAYS OUT
Azalea / Glendale / Wolf Creek / Sunny Valley	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Cascade-Siskiyou NM	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Dunsmuir	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Happy Camp	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Hood River / Wasco Rural	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Hood River Urban (SE)	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Hood River Urban (West)	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Illinois Valley	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lost Creek Lake	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Merlin	Normal	Normal	Normal	Normal	Normal	Normal	Normal

7-day PSPS forecasting table

Wildfire safety resource center and PSPS tools available at:

www.pacificpower.net/wildfiresafety

PSPS Coordination

Plan Development Coordination

- Public Sector
 - Emergency Management agencies were consulted and coordinated on final plans
- Critical Facilities
 - Master critical facility list was created
 - Facilities will be considered regarding criticality and need on a dynamic basis for any event

Exercise and Evaluation

- Table top exercise
 - Scheduled for June 3 in Weed, CA
 - Venue TBD
 - Zoom option will be available

Plan Development Coordination

- Public Sector
 - Emergency Management agencies were consulted and coordinated on final plans
- Critical Facilities
 - Master critical facility list was created
 - Facilities will be considered regarding criticality and need on a dynamic basis for any event
- Evacuation and Egress Routes
 - No PSPS affected communities within the company's service territory have been identified as having only one route in or out

PSPS Outreach

Databases & Access and Functional Needs (AFN) Customers, Critical Infrastructure and Master Metered Customers

- PacifiCorp utilizes a customer service system (CSS) to identify medical baseline customers (rate schedule), self-identified vulnerable customers and customers with Standard Industrial Classification (SIC) codes that identify them as critical infrastructure.
- PacifiCorp created a code in the CSS to flag customers who would benefit from receiving extra notifications (access and functional needs).
- CSS is the system of record. Data from the enterprise data warehouse (EDW) can have up to a two-day delay. The data is kept current and lists are refreshed every time they are extracted.
- PacifiCorp partners with community based organizations (CBOs) to encourage customers to contact the company to self-identify and maintain accurate and current contact information. Customers can self-identify as vulnerable, including medical baseline customers, customers with life support equipment, and so forth.
- Letters will be sent to master metered customers requesting their assistance in identifying tenants that may also have special needs and would require additional notification before, during, and after a wildfire event.

PSPS Outreach

Database Interaction

- Operational tools that support PSPS and emergency planning functions consume data from CSS, where impacts are then able to be quantified and evaluated.
- The CSS data can be fed into the call software allowing the company to perform necessary outbound calls.

PSPS Outreach

Customer Count by Coding

COUNTS							
CLASS	LOW INCOME (On CARE Rate)	LIF (Life Support)	MED (Medical Condition)	PS (Customers who identify as needing more notification (i.e. pregnancy))	CRITICAL (Critical Infrastructure)	PDZ (Customers located in a PDZ)	BASELINE (Rate Schedule)
Non-PDZ	8,923	41	42	105			88
PDZ	2,480	4	5	35	202	11,029	31
TOTAL	11,403	45	47	140	202	11,029	119

PSPS During a Pandemic

Response Coordination – Public Sector, Mutual Assistance and Community Resource Centers

- Public Sector
 - Coordination with public sector agencies such as county emergency management will occur as early as feasible as forecasting confidence becomes higher
 - 72 hour advance notice to Emergency Management Agencies is the goal
 - Current pandemic practices will be coordinated immediately upon identification of potential event
- Mutual Assistance
 - The company belongs to multiple Mutual Assistance Groups which it can leverage to mitigate any unforeseen shortfalls of either parts, equipment or manpower
 - Mutual Assistance Groups have created procedures for support during pandemic response
- Community Resource Centers
 - CRCs have developed plans to continue to support the community as needed while maintaining appropriate actions in accordance with state and county guidelines during a pandemic