

Don't Sweat It: Designing for Extreme Heat and Resilience

Presenters:

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LOOKING BACK TO



MOVE FORWARD

Climate files + building performance modeling

TMY – Typical Meteorological Year

Current industry standard (TMY3) using average historical data from 1990-2005.

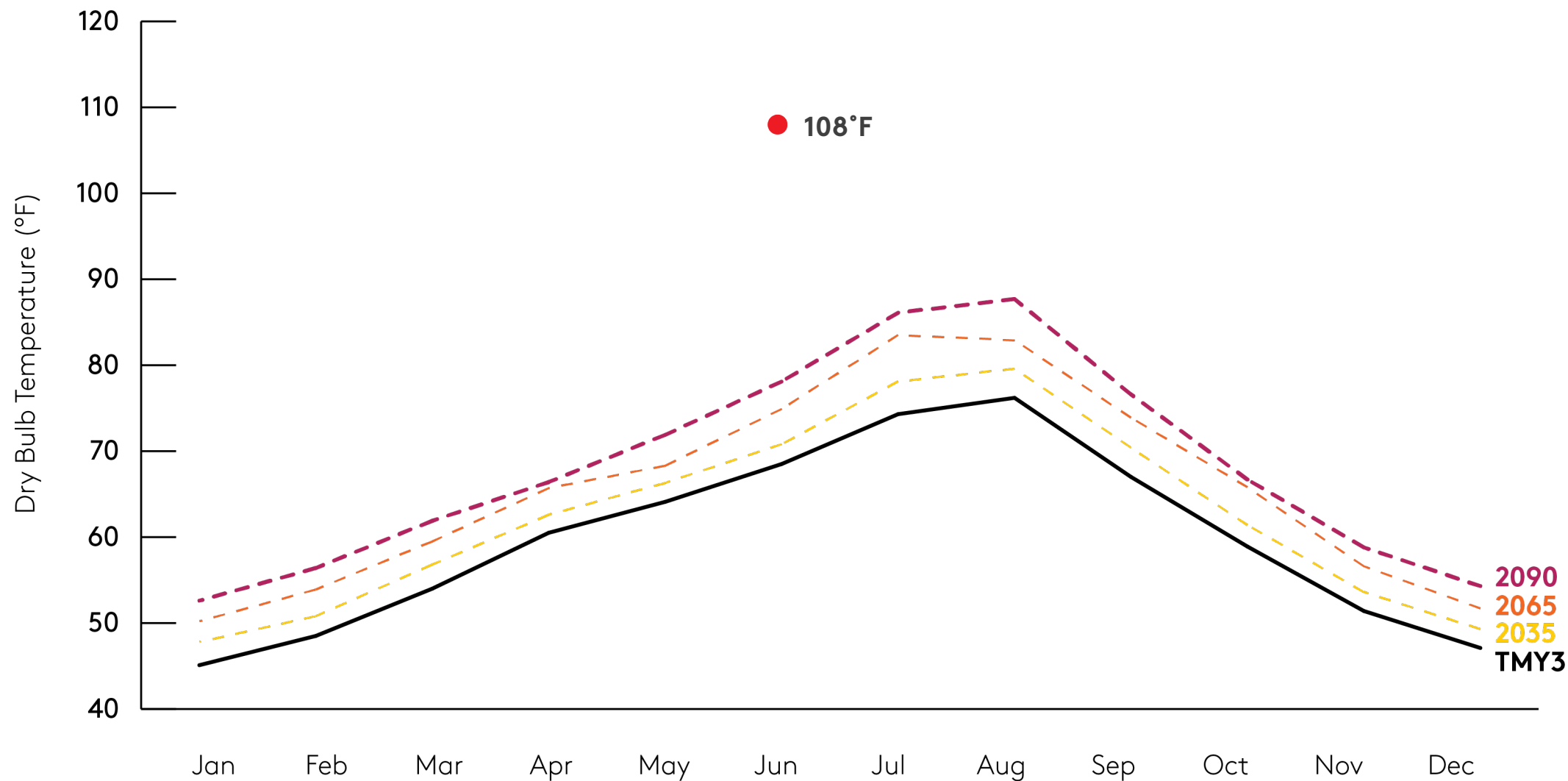
FMY – Future Meteorological Year

Based on projections for 2050/2080/etc. under different IPCC emissions scenarios.

AMY – Actual Meteorological Year

Measured climate data for a specific year.

DBT (Dry Bulb Temperature) Seattle, WA





The Bush School
Seattle, WA / CZ 4C
Passive House certified

June 2021

Pacific Northwest Heat Dome

Province / State records

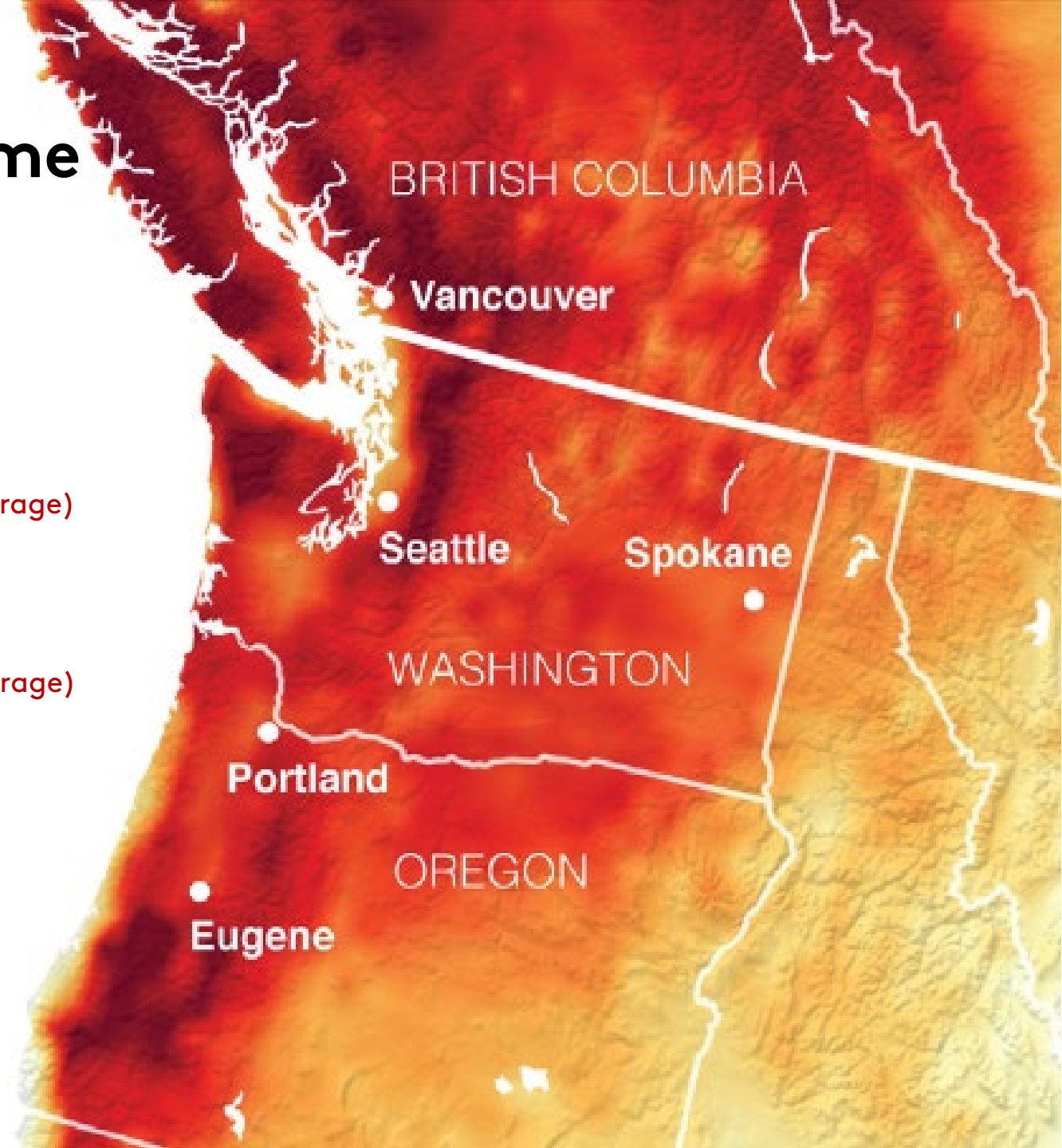
Lytton, BC	121.3°F
Hanford, WA	120.0°F
Pelton Dam, OR	119.0°F

City records

Portland, OR	116.1°F (+40°F above daily average)
Street pavement	180°F
Eugene, OR	111.0°F
Spokane, WA	109.0°F
Seattle, WA	108.0°F (+34°F above daily average)
Maple Valley	118°F
Vancouver, BC	95.0°F
Abbotsford	109 °F
Burnaby <u>low</u>	84 °F

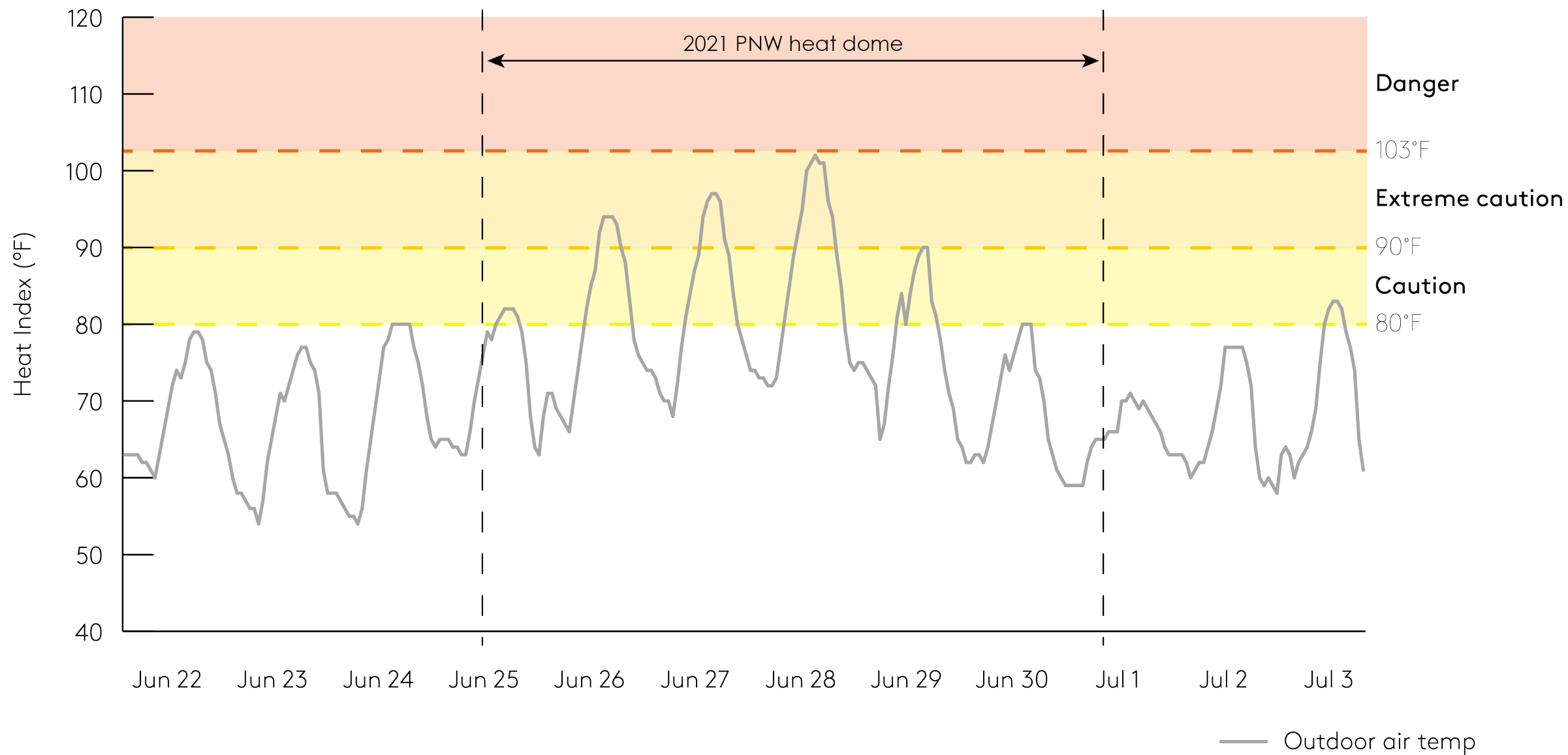
685 deaths in Canada
(808 total excess heat-related deaths)

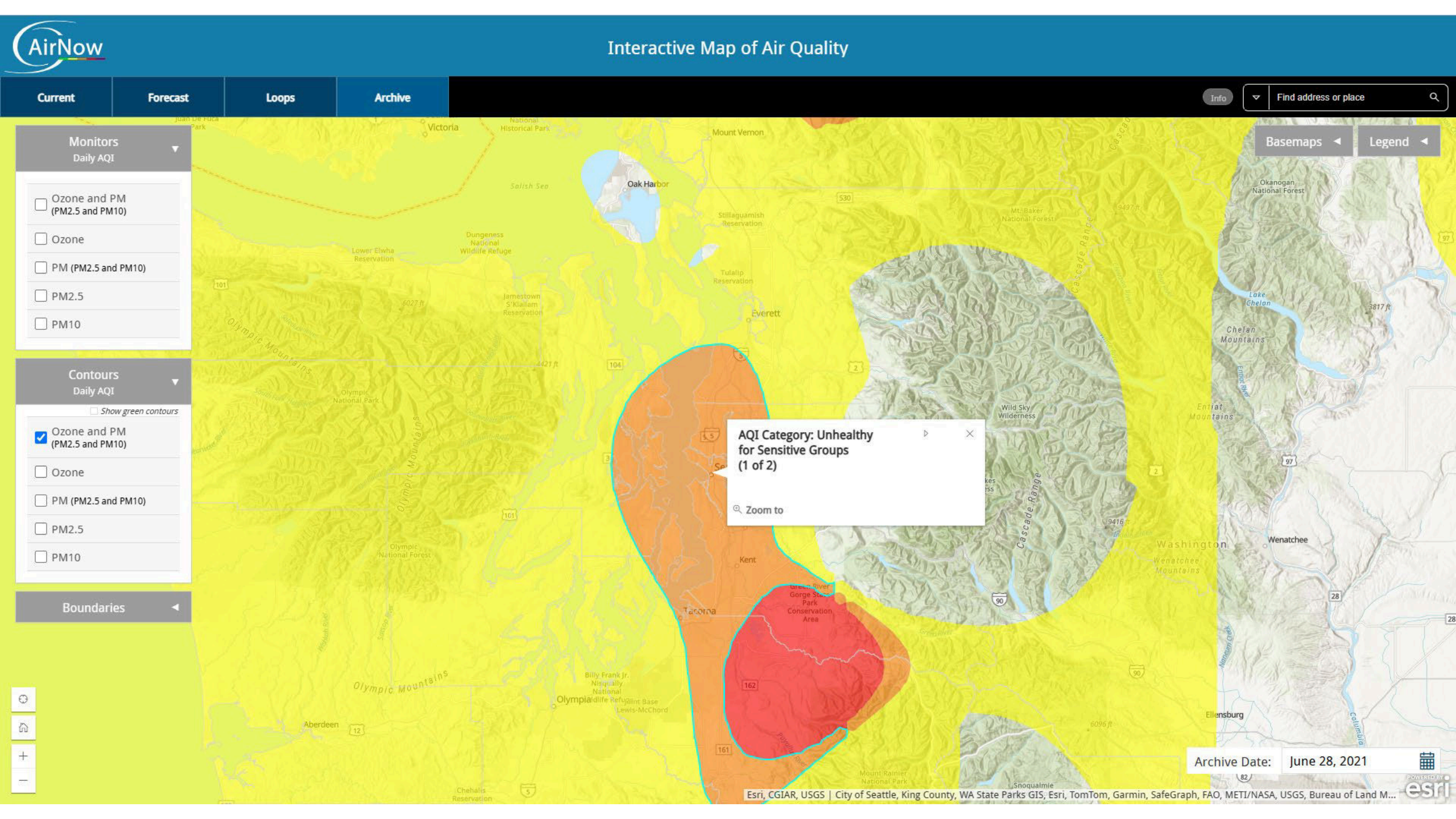
229 deaths in USA
(~670 total excess heat-related deaths)



Passive Survivability: Ability of a building to maintain safe thermal conditions in the event of an extended power outage or loss of critical services like heating or cooling

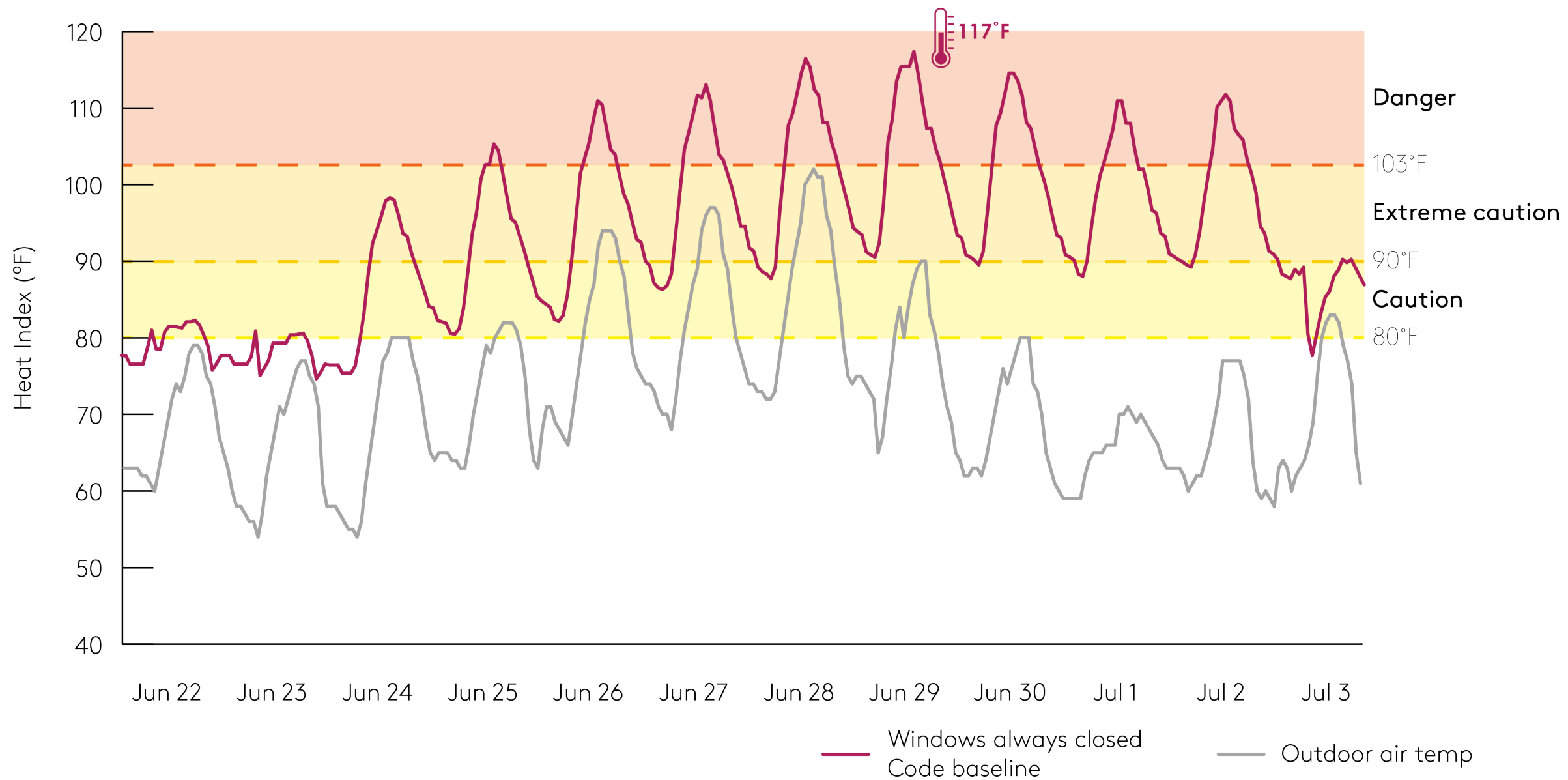
2021 PNW heat dome





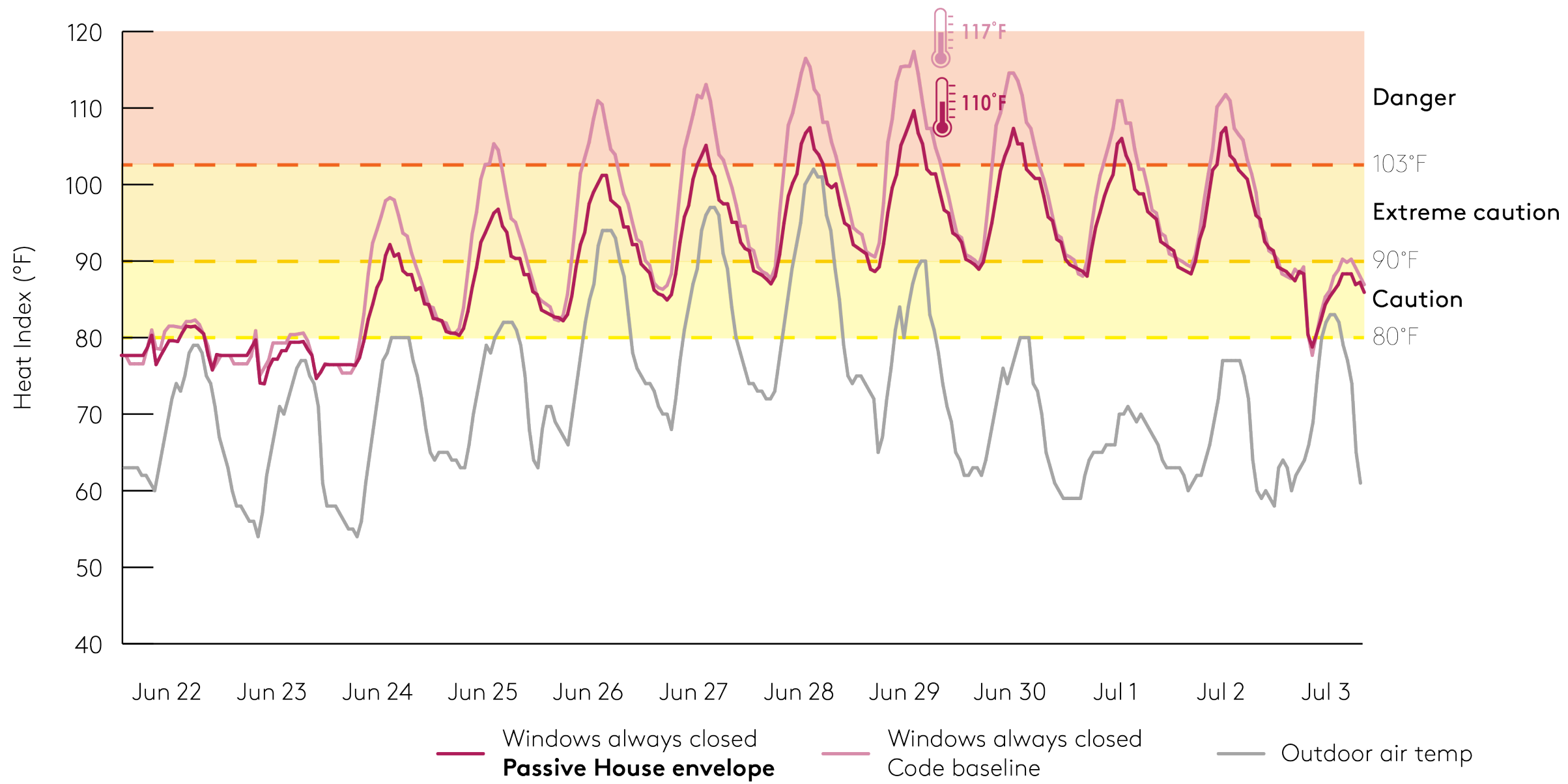
2021 PNW heat dome + power outage

Code baseline and Passive House envelopes, windows closed



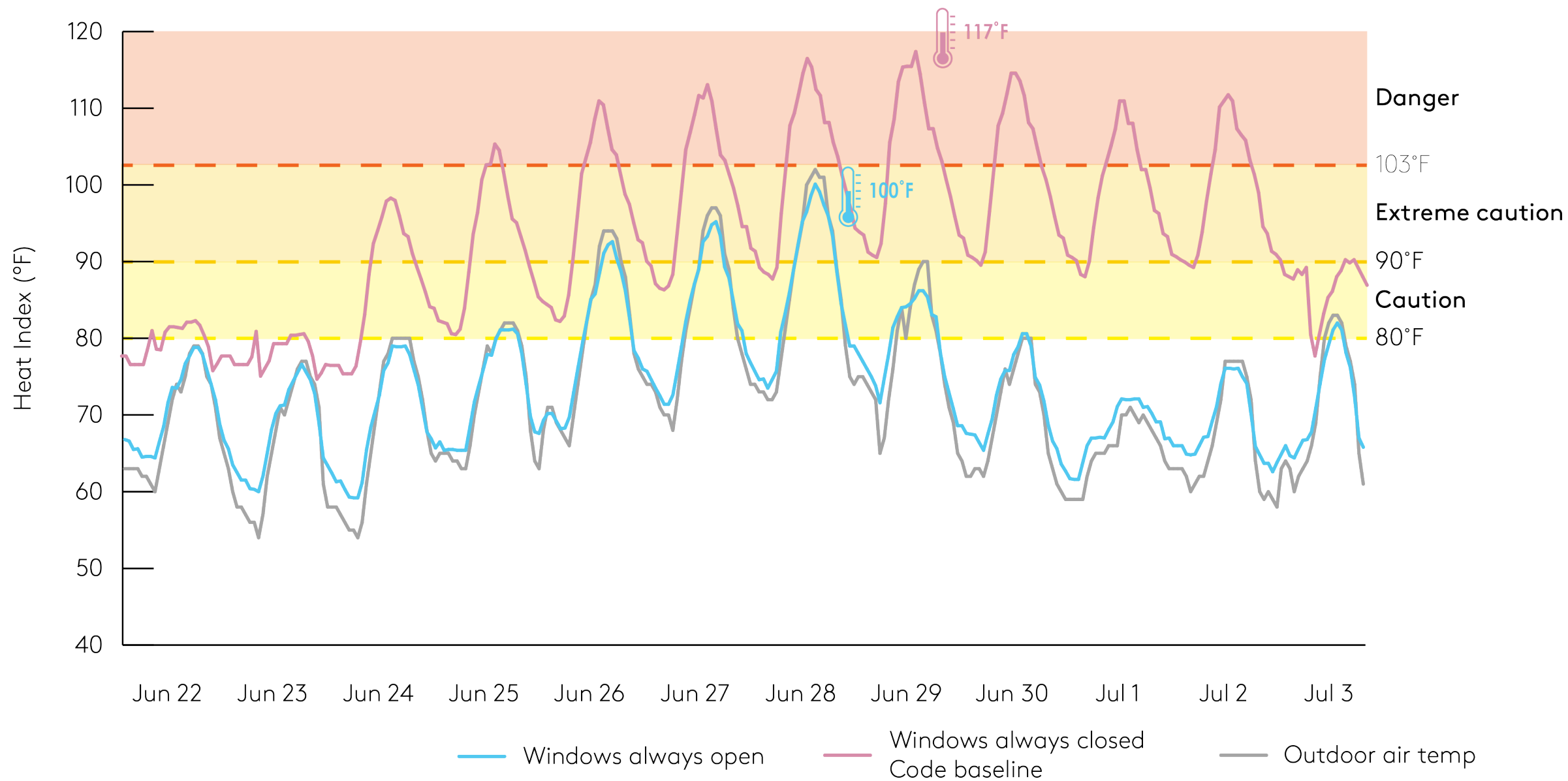
2021 PNW heat dome + power outage

Code baseline and Passive House envelopes, windows closed



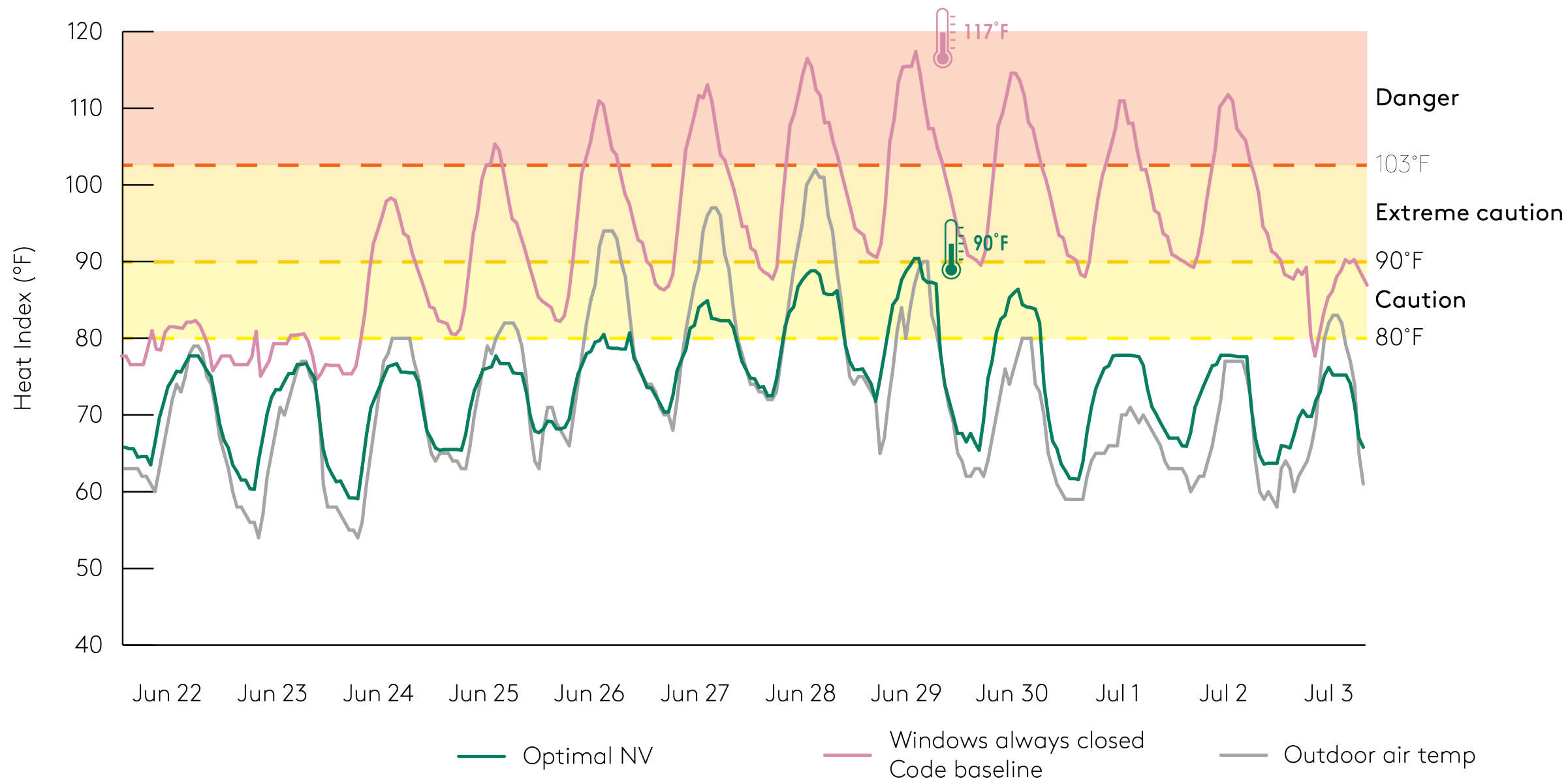
2021 PNW heat dome + power outage

Passive strategies



2021 PNW heat dome + power outage

Passive strategies



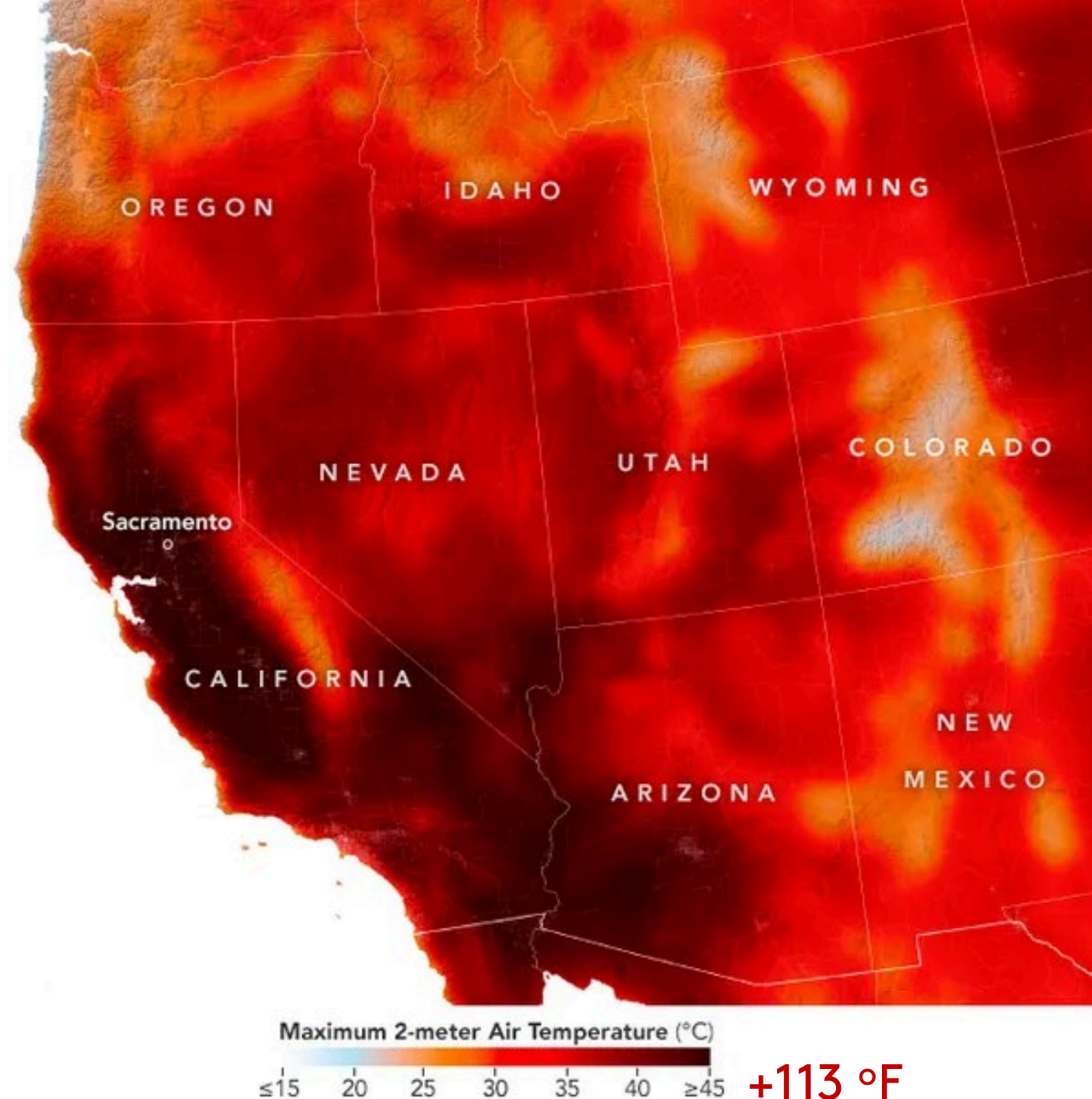


**Homeless Prenatal Program Housing
San Francisco, CA / CZ 3C**

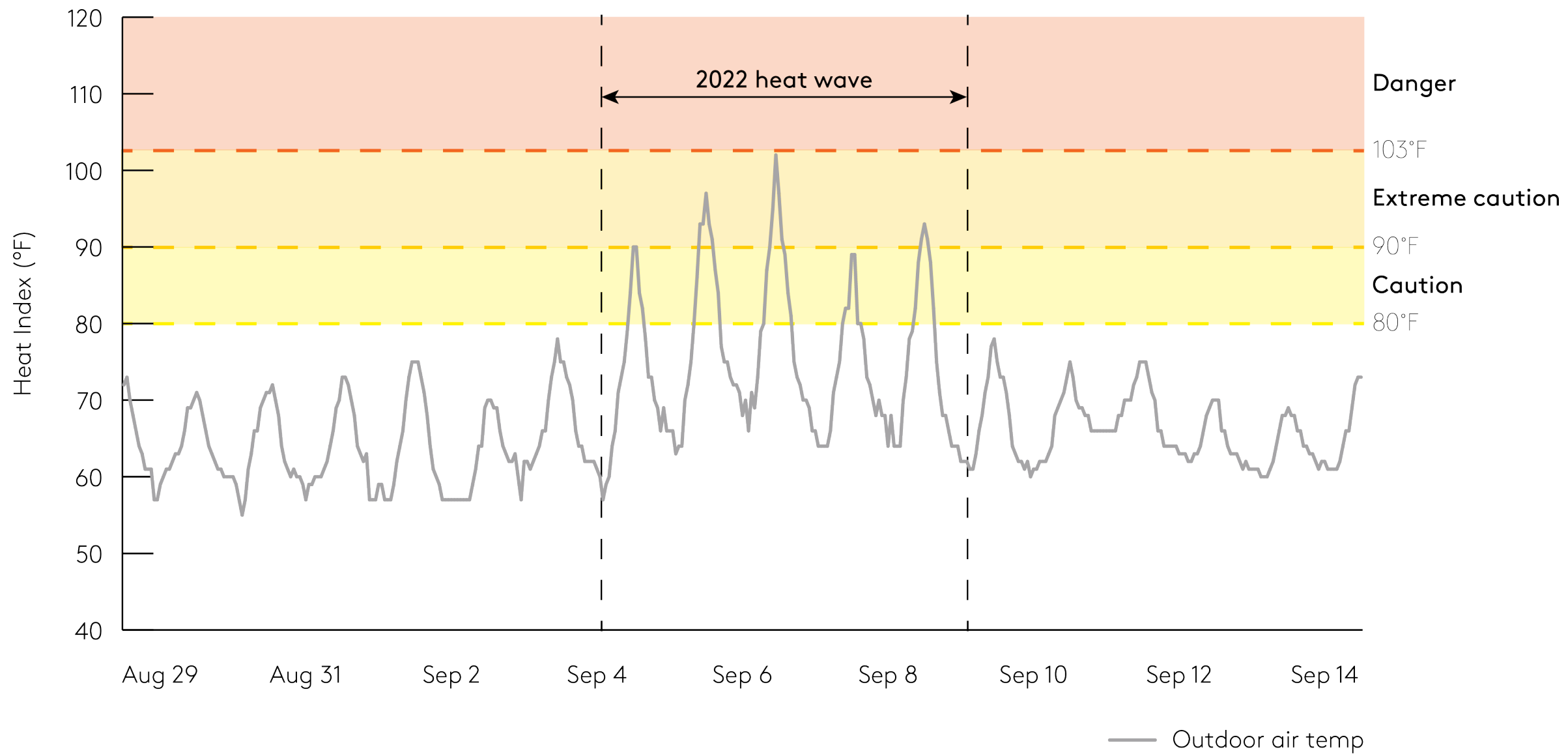
September 2022 California / Southwest USA

Death Valley, CA	127.0°F
Overnight low	99.0°F
Sacramento, CA	116.0°F
Napa, CA	114.0°F
Long Beach, CA	109.0°F
San Jose, CA	109.0°F
Salt Lake City, UT	107.0°F
Oakland, CA	104.0°F
San Francisco, CA	97.0°F

117 deaths in California
(395 total excess heat-related deaths)

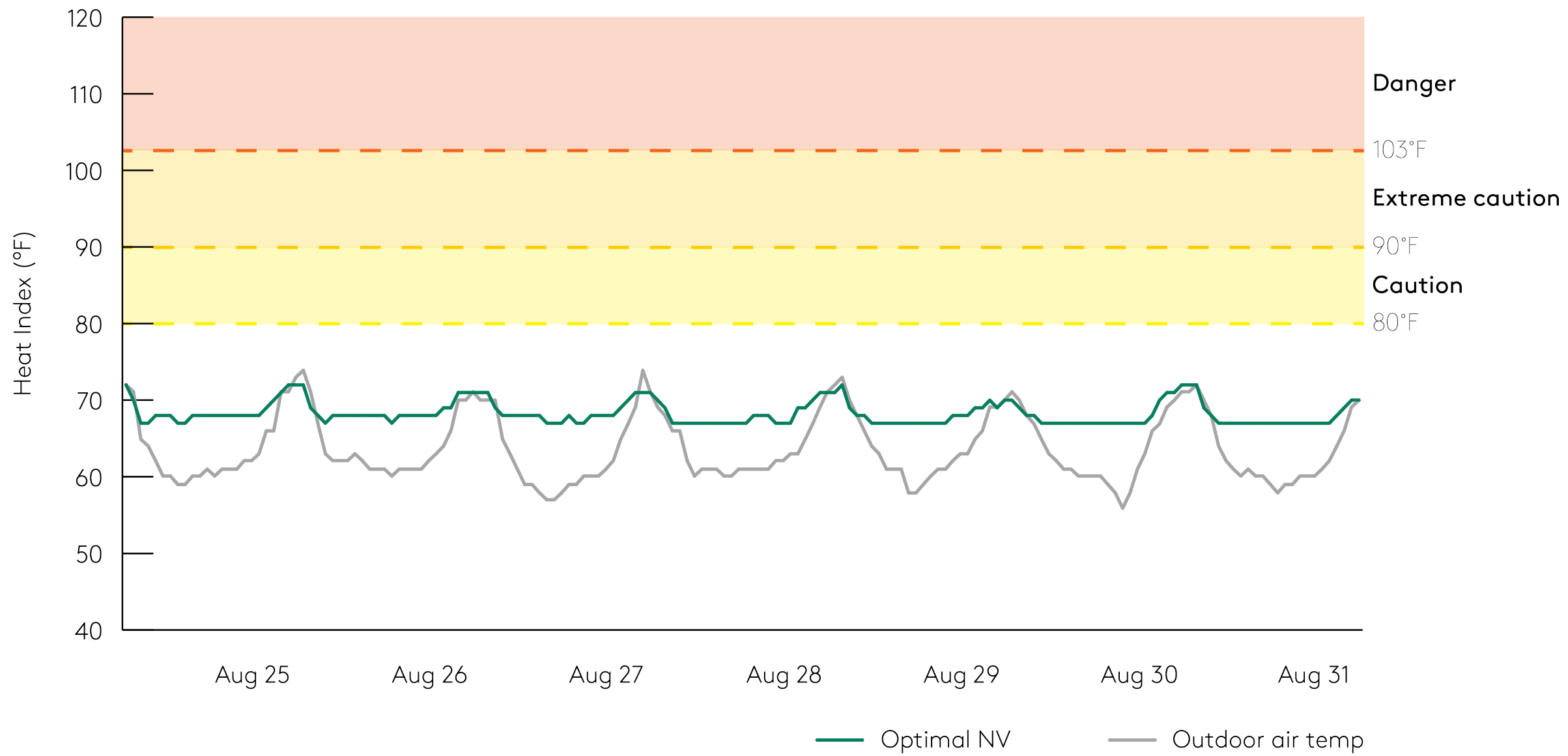


2022 CA extreme heat wave



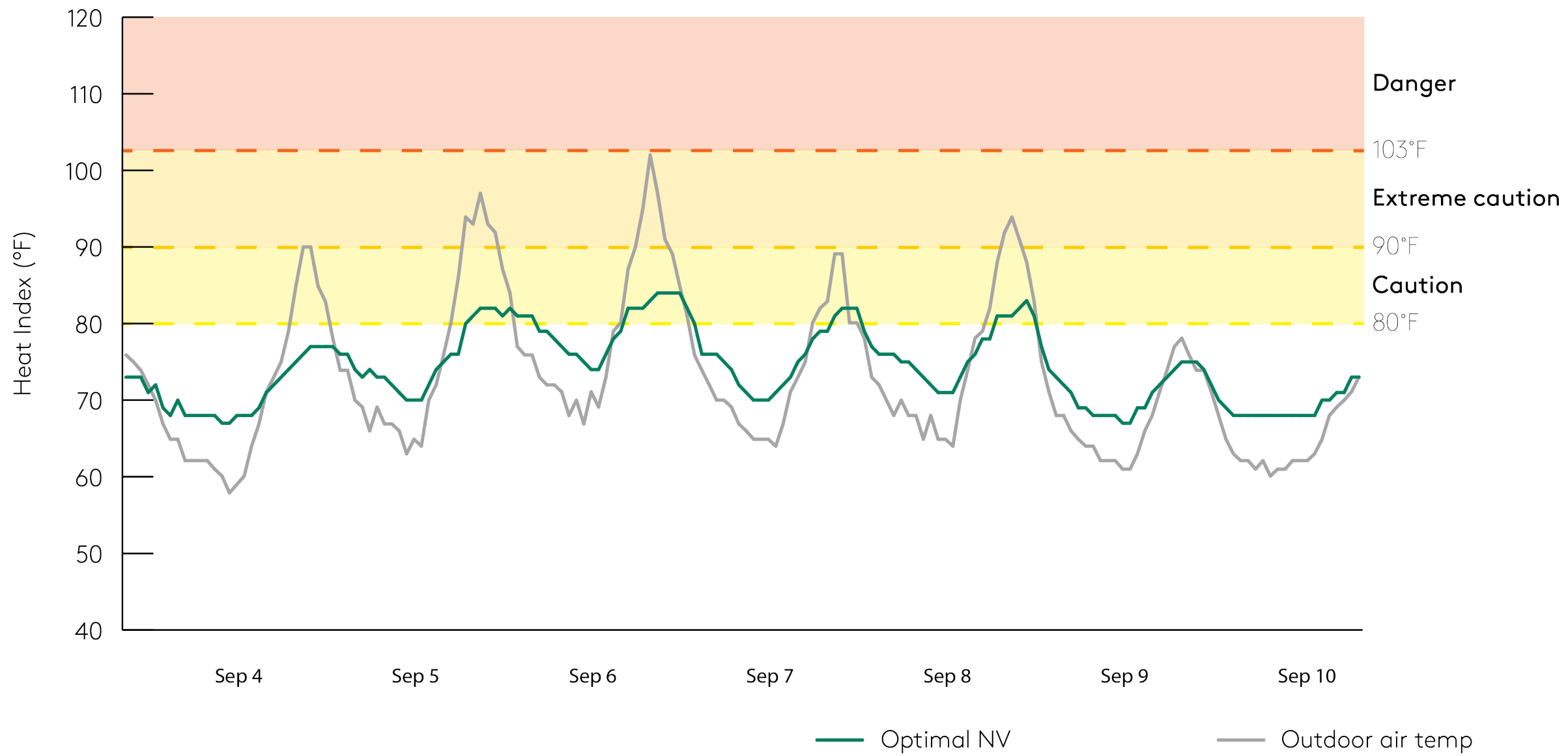
Typical (baseline) comfort

The week before the heat wave



2022 CA extreme heat wave

Indoor comfort during the heat wave



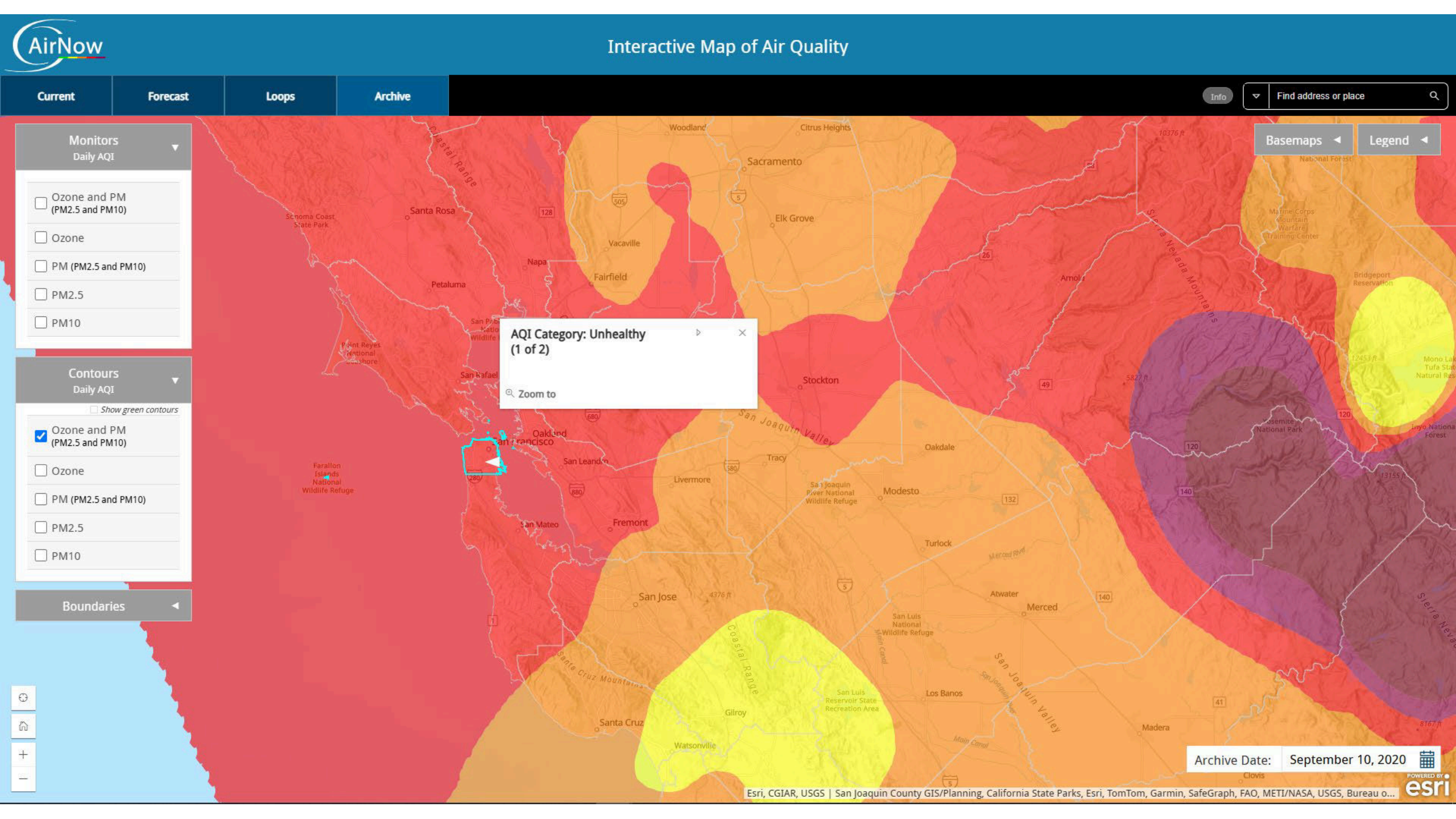
- ☐
- PM10

☐ *Show green contours*

- ☐
- PM10

AQI Category: Moderate
(1 of 2)

 Zoom to



2022 CA extreme heat wave + wildfire

Indoor comfort coinciding with poor outdoor air quality

