National Weather Service
Western Region
Heat Impact Level (HIL) Project

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Introduction

• Partners want advanced notice to make decisions

• Heat impacts more than just human health
  – Infrastructure
  – Power
  – Agriculture
  – Livestock

• To move toward a Weather Ready Nation with respect to heat, our current system should be improved.
Heat Impact Level (HIL)

- **Goal:** To develop a heat impacts forecast that:
  - Puts expected heat into climatological context
  - Is available through the entire length of the forecast
  - Allows users and partners to take actions needed at their time scale using a simple color scale of potential impact levels
Heat Impact Level (HIL)

• **Goal:** To develop a heat impacts forecast that:
  
  – Is at high resolution to adequately account for varied terrain
  
  – Takes advantage of high resolution climate data and gridded forecasts
  
  – Serves as a framework to build consistency and science into our legacy products and emerging social media messaging capabilities
Recent CA Research

• *The Impact of Recent Heat Waves on Human Health in California (2013)* – Guirguis et. al.

  – Criteria should consider **local thresholds** for acclimation to local climatology as well as seasonal timing
  – **Results using high temperature alone worked best** in describing the heat-health relationship in CA.
  – The majority of events do fall in the **top 5% above the 95th percentile**.
  – California could benefit from a **multi-tiered system** that accounts for the vulnerabilities of different populations.
Other Heat Items

- **Early season heat** (first heat wave) can have greater impact due to “mortality displacement”
- Those **without a/c** (or choose not to use), those with chronic physical/mental **health conditions, elderly, young, athletes, and outdoor workers** are particularly vulnerable
- Heat impacts can start at **relatively low temperatures**
- Gathering heat morbidity and mortality statistics is **very challenging**.
- Tying one criteria or index to the myriad of heat impacts is **very challenging**.
How Can We Do This?

For each robust observation point: Develop **local relationships** which use near record high and low temperatures as the foundation.

Over 1400 point observations in Western U.S.
How Can We Do This?

Define **unique thresholds** at each location indicating the **level of impacts** possible:

- **Green** – Little to no potential
- **Yellow** – heat related impacts unlikely
- **Orange** – heat related impacts possible
- **Red** – heat related impacts likely
How Can We Do This?

Utilize a **high resolution climatology** (PRISM) database to create unique thresholds at all other points over a 2.5 X 2.5 km grid in the Western U.S.

Max Temperature Curves
MinT similar to MaxT Process

Utilize a **high resolution climatology** (PRISM) database to create unique thresholds at all other points over a 2.5 X 2.5 km grid in the Western U.S.

Daily threshold grids generated
It’s a Framework, Not a Criteria

• Last year HIL 1.0 which focused on the high temperature relationship
  – Worked pretty good but overnight recovery/duration important
• This year, the **min temperatures** and **duration** (HIL 2.0) are incorporated
• This shows the HIL framework supports **adding complexity** as heat health science and heat impact research allow:
  ✓ Account for overnight min temps
  ✓ Consecutive day occurrences
  ✓ Humidity/apparent temperature
    ✓ minT proxy for humidity
National Value

Over 7000 stations
NOAA/NWS
Western Region
Heat Impact Level Project

- A color-coded index that:
  - Puts expected heat into climatological context
  - Is available through the entire length of the 7-day forecast
  - Allows users and partners to take actions needed at their time scale using a simple color scale of potential impact levels
  - Is at high resolution to adequately account for varied terrain
  - Takes advantage of updated PRISM data and gridded NWS forecasts
  - Serves as a framework to build consistency and science into NWS legacy products and emerging social media messaging capabilities
Questions?

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