# TAKING CONTROL OF THE IMPACT OF SEVERE WEATHER

FOR SMARTER DECISIONS AND FORECASTS

YOU CAN'T CONTROL THE WEATHER, BUT WITH THE RIGHT DATA YOU CAN MAKE SWIFT, SMART DECISIONS TO ENSURE YOUR FORECASTS, STAFFING AND INVENTORY MANAGEMENT ALIGN WITH INCOMING IMPACT - **SAVING QSR CHAINS MILLIONS** EVERY YEAR.



### UNDERSTAND THE IMPACT OF SEVERE WEATHER IN ADVANCE

#### "THERE WERE 22 SEPARATE BILLION-DOLLAR WEATHER AND CLIMATE DISASTERS ACROSS THE US IN 2020, SHATTERING THE PREVIOUS ANNUAL RECORD OF 16 EVENTS."

Source: National Oceanic and Atmospheric Administration

Severe weather is one of the most disruptive events for businesses. Working with leading QSR chains across the USA, PredictHQ's research identified severe weather events caused **significant forecasting inaccuracies for 58% of QSR stores analyzed, costing thousands in wasted inventory and staffing.** 

Yet QSR companies struggle to factor in the full impact of severe weather into their demand forecasting in time to prepare for it.

### Once you understand incoming impact you can:

- Adjust your staffing strategies
- Update your inventory plans and orders.
- Redistribute assets to stores that will be less affected, to minimize waste.
- Prepare targeted recovery strategies.

This means they can have **datadriven strategies** matched to each severe weather event's intensity and their impact. Let's dive in.

# IDENTIFYING TRUE DEMAND IMPACT

The first step in taking control of severe weather is to identify its impact with your historical sales data. You do this by comparing your historical data to verified, forecast-grade event data like PredictHQ's.

PredictHQ works with many large, national QSR companies. Our research across thousands of retail locations found more than 58% had a significant forecast accuracy improvement incorporating severe weather due to:

- Identifying and accounting for previous historical anomalies so they could be excluded from baseline modelling.
- Increasing the forecasting team's understanding of when a severe weather impact would begin, and how long it would last for.

Below is an example of how traditional forecasting misses the impact of hurricanes, costing companies thousands in wasted inventory, overstaffing and costly supply chain delays.



Timely, targeted store-level forecasts are possible, you just need the right external data to unlock this capability. Through testing we've found a **3%** relative improvement in forecasting accuracy.

### UNLOCK THE VALUE BETTER SEVERE WEATHER FORECASTING

Once a QSR chain learns how to factor in severe weather data into their forecast, they can save millions each year by understanding *and preparing* for its true impact. This preparation could be upping inventory for products that tend to sell more: we've found breakfast sandwiches and coffees surge in popularity during severe cold weather for example. Or adjusting your staffing for more delivery drivers and fewer in-house staff to match ordering patterns.

Let's take a look at an example:

- Below is a Winter Storm event in Maryland on 20 February, 2019.
- Without severe weather incorporated into the forecasting model for a store in this location, it predicted around **7,000** units sold.
- The actual demand was for **~3,700**, a significant and costly over-forecast, wasting inventory and staff investment.
- Using PredictHQ's severe weather data, the model forecast ~3,400 units sold much closer to the actual results when including severe weather in the forecast.
- With more than **26,793** severe weather events in our systems for 2019, that's a lot of overforecasting companies don't need to be losing millions to.



With such significant potential for more accurate forecasts, minimizing losses and no longer being reactive to severe weather, the big question is why this practice isn't standard across the QSR industry already.

The answer is simple: severe weather data has never been available as forecast-grade, model-ingestible data until PredictHQ built **Demand Impact Patterns** and enabled **polygons**. Let us introduce them, and the millions in savings QSR chains can enjoy with them.

### UNDERSTANDING IMPACT ON QSR BUSINESSES

YOU CAN'T CONTROL THE WEATHER. YOU CAN CONTROL YOUR STAFFING AND STOCKING TO MINIMIZE IMPACT, SAVING MILLIONS EACH YEAR.

#### UNDERSTAND IMPACT AS SOON AS A WARNING LANDS

The challenge for QSR chains trying to understand the impact of severe weather on their forecasting and sales is that even the largest chains lack the scale of relevant severe weather events to arrive at statistically significant and reliable demand impact patterns.

PredictHQ has done this for the QSR industry so they can understand the full impact of a severe weather event, which begins before the event and often continues for days.

For example:

#### MODERATE FLOOD

The Demand Impact Pattern for a moderate flood reveals that for most QSR stores, demand will drop off for two days before and after the actual event itself.



# UNDERSTANDING THE FULL SCOPE OF A SEVERE WEATHER EVENTS IMPACT

And that's just for a moderate flood. Each severe weather impact pattern is different depending on the severity. PredictHQ has created 73 (and counting) Demand Impact Patterns to ensure our customers know to prepare for impacted demand beyond the day(s) of the incidents itself.

These patterns are available with each severe weather watch and warning in our system. This means rather than wait for event itself, your demand forecasting models can start to align your strategies to the anticipated demand impact, saving thousands in staffing more accurately as well as diverting inventory away to better locations to minimize waste.



PREDICTHQ HAS UNIQUE MODELS TO VERIFY SEVERE WEATHER WATCHES AND WARNINGS. OUR RESEARCH REVEALED DIRECTLY INGEST NWS DATA DELIVERS A FALSE POSITIVE RATE OF AT LEAST 30% FOR WATCHES AND 8% FOR WARNINGS, UNLESS THEY BUILD A COMPLEX REAL-TIME EVENT PIPELINE, LIKE PREDICTHQ HAS.

#### How QSR chains use Demand Impact patterns:

- Begin by conducting an analysis with PredictHQ to discover how severe weather events impact your demand and setting up the appropriate responses to different levels of demand impact generated by these events.
- 2. When a watch or warning event arrives in PredictHQ's API, your models know the expected impact on your demand.



# HOW TO USE DEMAND IMPACT PATTERNS

## UNDERSTAND BOGRAPHIC PACT WITH PACT WITH POLYGONS

To create accurate amended forecasts and recovery plans for severe weather, companies need to know the location and extent of a severe weather warning and event.

For example, to the right is a Hard Freeze Warning issued for Utah. but it would have been a mistake to update the forecasts for all stores across state in the same way. PredictHQ's severe weather event include polygon showing the impacted area so that you can discover exactly where the event will have direct impact.

This tech provides granular geographic information, rendered as model-ingestible data so your models can evolve as quickly as severe weather watches, warnings and events do.



UNDERSTAND WHICH STORES WILL BE IMMEDIATELY IMPACTED BY THE EVENT, AND WHICH SUPPLY CHAINS WILL BE DISRUPTED WITH POLYGONS

### RATHER THAN UPDATE AN ENTIRE STATE OR CITY WORTH OF STORE FORECASTS, FOCUS ON THE STORES AFFECTED MOST AND RE-DIRECT INVENTORY TO LESS IMPACTED STORES

Polygons enable you to know exactly which stores and supply chain routes are likely to be impacted.

To use PredictHQ's polygon information:

- 1.Simply call the API to get back all events impacting a location based on latitude and longitude.
- 2. The polygon information will determine if severe weather events are impacting your location or not.
- 3. Then use the severe weather events impacting your location for your forecast both in your training data set and the regularly updated events data you pull into your pipeline for daily forecasting.



# MOREACCURATE ALERTS WITH POLYGONS

### SMARTER FORECASTING WITH SEVERE WEATHER



TAKE CONTROL OF THE IMPACT OF SEVERE WEATHER WITH PREDICTHQ'S DEMAND INTELLIGENCE

#### **PINPOINT HISTORICAL IMPACT**

Combine your data with PredictHQ's five years of historical data to pinpoint the impact of severe weather on your demand.

#### ALIGN RECOVERY STRATEGIES

Use Demand Impact Patterns to to guide your recovery strategy development, including factoring in the full impact, not just the impact on the day of the events.

#### **ACCESS LOCATION IMPACT**

Use PHQ Polygons to know which locations and routes are directly affected so you can more accurately respond to events.

### SAVE MILLIONS WITH BETTER RESPONSES

The PredictHQ team is standing by to assist your team to level up your demand forecasting and planning for severe weather events etc. We've already worked with customers to reduce their forecast accuracy by factoring in severe weather events.

### APPENDIX



### MORE INFORMATION ON THE DATA SCIENCE BEHIND PREDICTHQ'S SEVERE WEATHER SOLUTIONS

How Demand Impact Patterns Work - our Chief Data officer explains how we built and tested Demand Impact Patterns

Introducing Demand Impact Patterns: How to use DIP in forecasting

How to factor severe weather into demand forecasting and planning at scale

Introducing Polygons: More accurate geographical impact information

Questions, comments or need help getting started? **<u>Reach out to our team</u>** <u>here</u>.