

# SWIRE-CC INNOVATIVE PRODUCT DEMAND FORECASTING

- Abinav Yadamani
- Michael Mendoza
- Neil Samuel
- Rawali Male



# BUSINESS PROBLEM & PROJECT OBJECTIVES



Loss due to overage and Underage Production



Need for identification of optimal product launch region and Time period



Forecast Weekly Demand



Model Validation



Business Risk Evaluation

# ASSUMPTIONS

Regions Categorization:



- Northwest
- North
- West
- Central
- South
- East

# ASSUMPTIONS



Consecutive 13 Weeks of the Year



Unit Sales over Dollar Sales

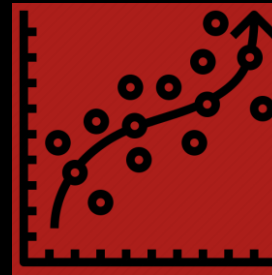
# STRATEGY



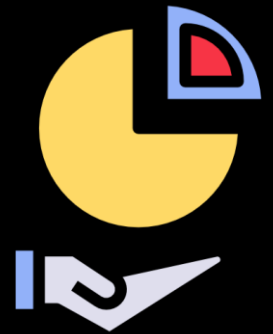
Consumer preference  
for Flavor, Brand,  
Category & Caloric  
segment



Flavor +  
Manufacturer +  
Region (Optional)  
are primary filters



Modelling



Account  
remaining  
filters



# QUESTION 1

**Item Description: Diet Smash Plum 11Small 4One**

**Caloric  
Segment:** Diet

**Market  
Category:** SSD

**Manufacturer:**  
Swire-CC

**Brand:** Diet  
Smash

**Package Type:**  
11Small 4One

**Flavor:** 'Plum'



**Which 13 weeks of the year would this product perform best in the market? What is the forecasted demand, in weeks, for those 13 weeks?**

# APPROACH



**PLUM + SWIRE  
+ DIET**



**MODELING &  
VALIDATION**



**TEST SET ERROR  
METRICS**



**MODEL  
SELECTION**



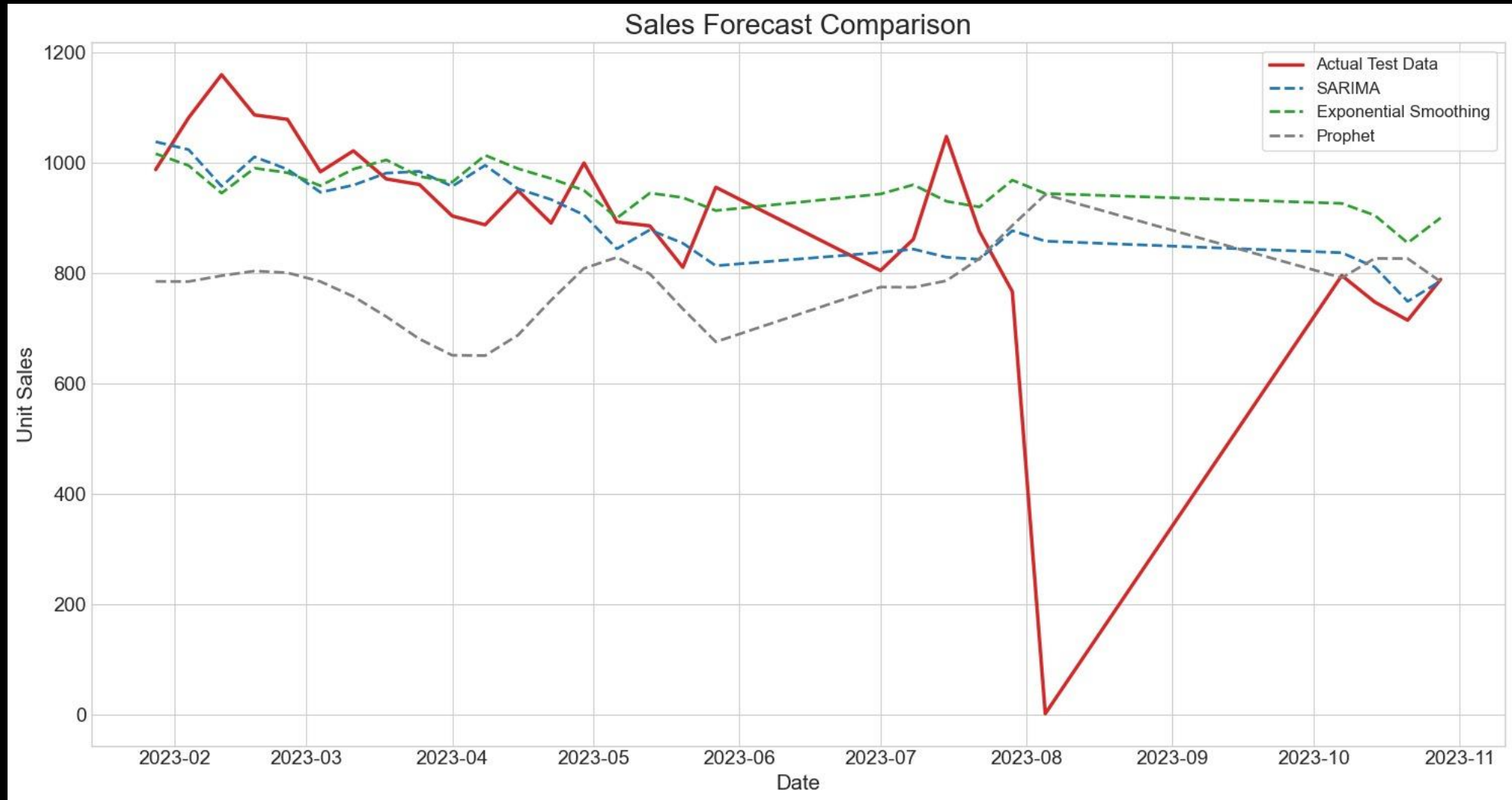
**BUSINESS RISK  
EVALUATION**

# MODELS CONSIDERED

Model	Why?
SARIMA	<ul style="list-style-type: none"><li>• Forecast + Trend + <b>Seasonality</b></li><li>• Works for only Stationary data</li></ul>
PROPHET	<ul style="list-style-type: none"><li>• Forecast + Trend + Seasonality + <b>Holidays</b></li><li>• Works for both stationary &amp; <b>non-stationary data</b></li></ul>
Exponential Smoothing	<ul style="list-style-type: none"><li>• Forecast + Trend + Seasonality + <b>Adaptive Updating</b></li><li>• Works for both stationary &amp; non-stationary data</li></ul>



# MODEL COMPARISON

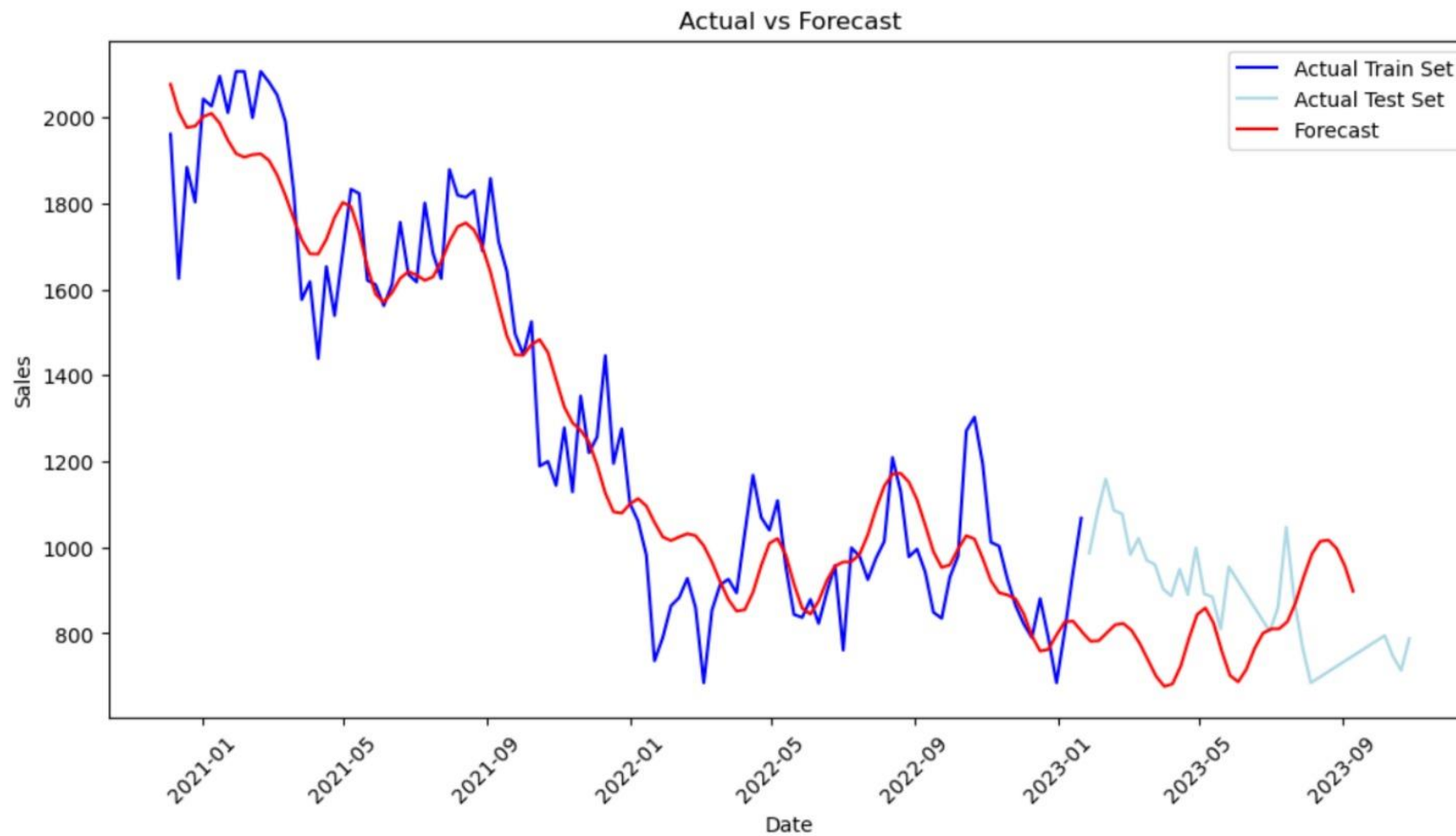


# RESULTS & BEST MODEL

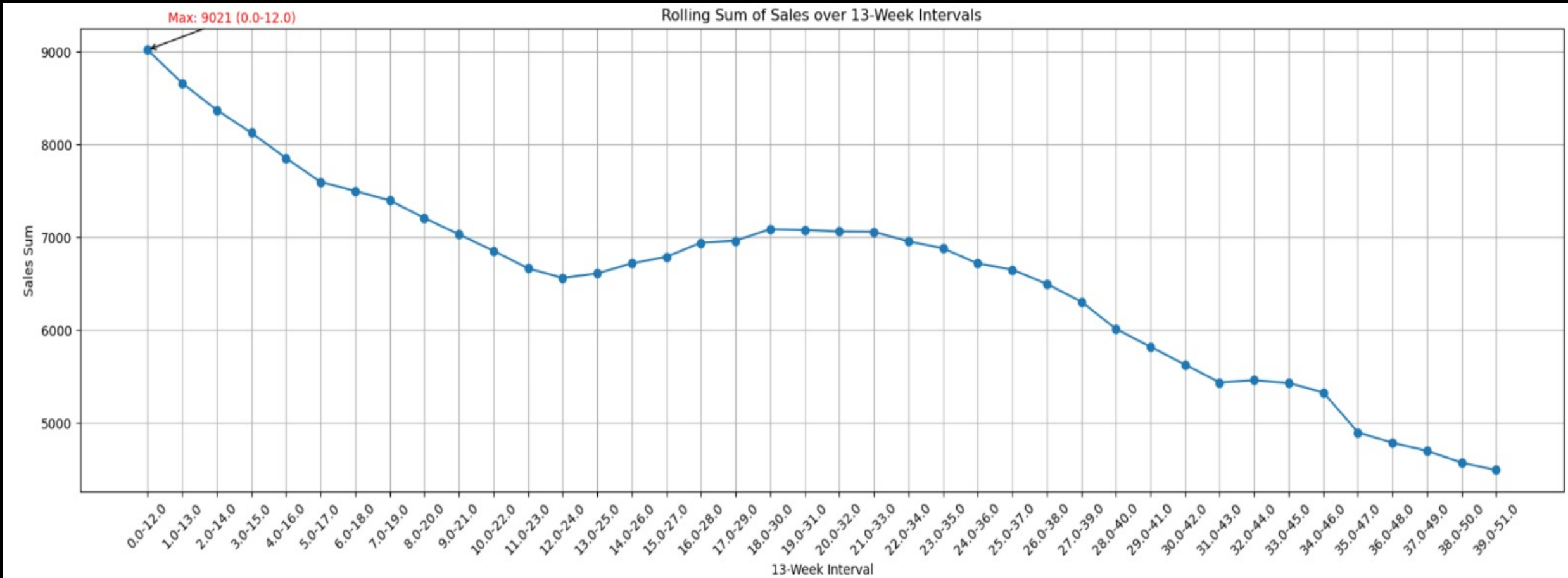
	MAE	MSE	RMSE	MAPE
<b>SARIMA</b>	68.33	7816.19	88.41	7.46
<b>Exponential Smoothing</b>	75.48	8465.57	92.01	8.46
<b>Prophet</b>	167.44	37388.58	194.52	17.90

Model	Best 13 Weeks	Forecasted Unit Sales
Prophet	1-13	9058
Exponential Smoothing	1-13	6049
<b>SARIMA</b>	<b>S</b> 1-13	<b>9021</b>

# MODEL VALIDATION

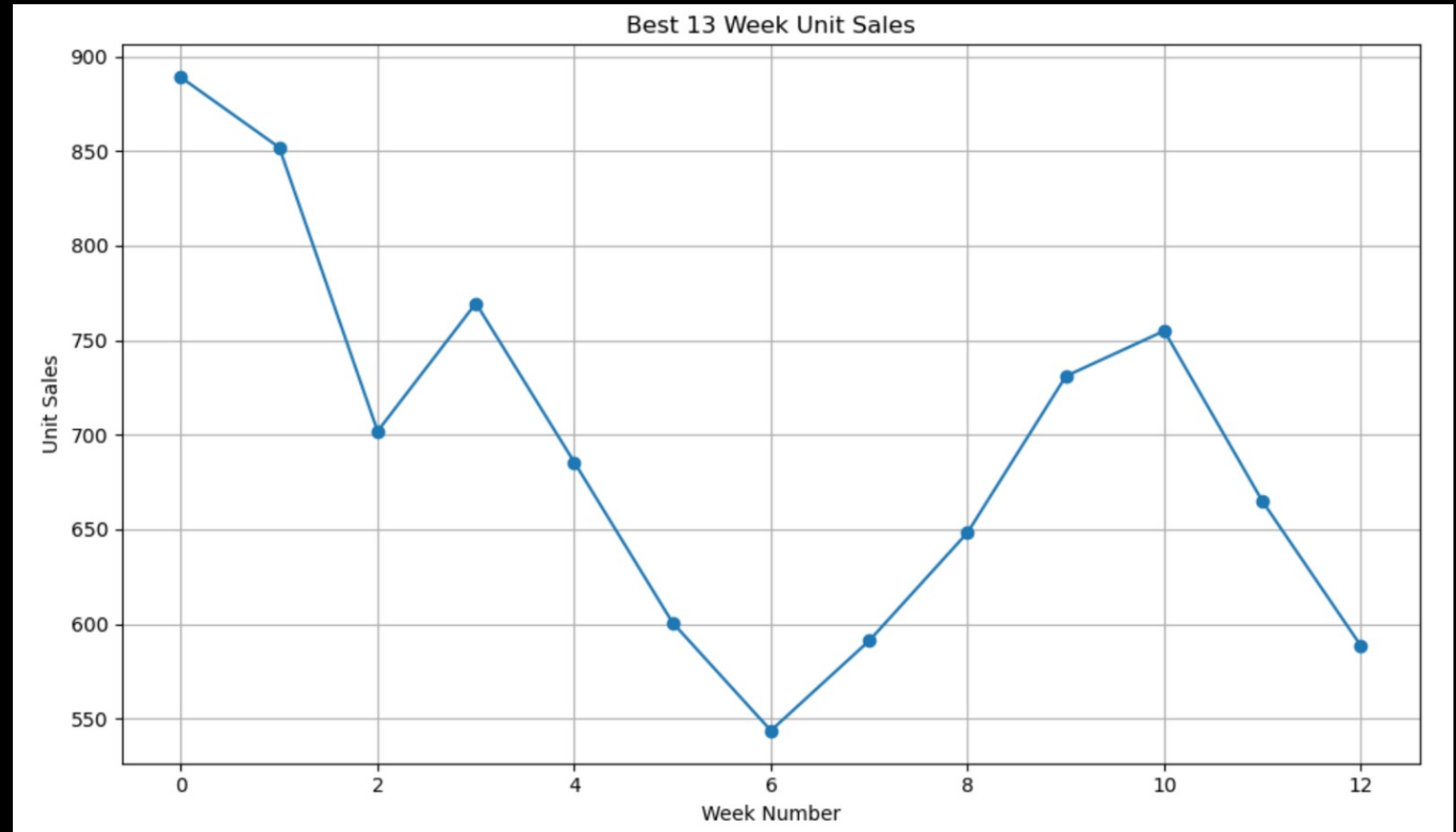


# BEST 13 WEEKS



# BEST 13 WEEKS – WEEKLY SALES FORECAST

Total Forecasted unit sales  
for best 13 weeks : **9021**



# BUSINESS RISK EVALUATION





**SP per unit**  
dollar sales (median)  
\$2



**Cost**  
80% of SP  
\$1.6



**Salvage**  
\$0

Cost Type	Computation	Result Per Unit	Scaled to 720 units
Underage	SP - Cost	\$ 0.5	\$ 380 
Overage	Cost - Salvage	\$ 1.6	\$ 1150 



# PROJECT LIMITATIONS



Model forecasts are accurate reference for initial stocking quantities only



Consumer taste & health preferences changes with time

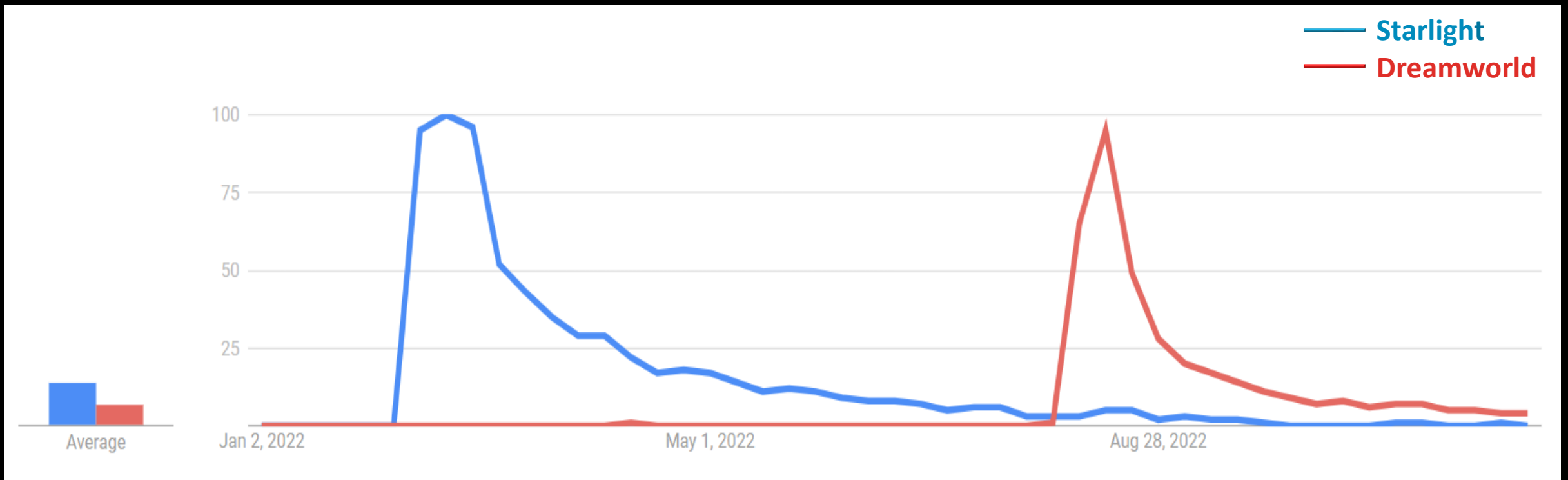


Marketing & packaging variations – adds uncertainty

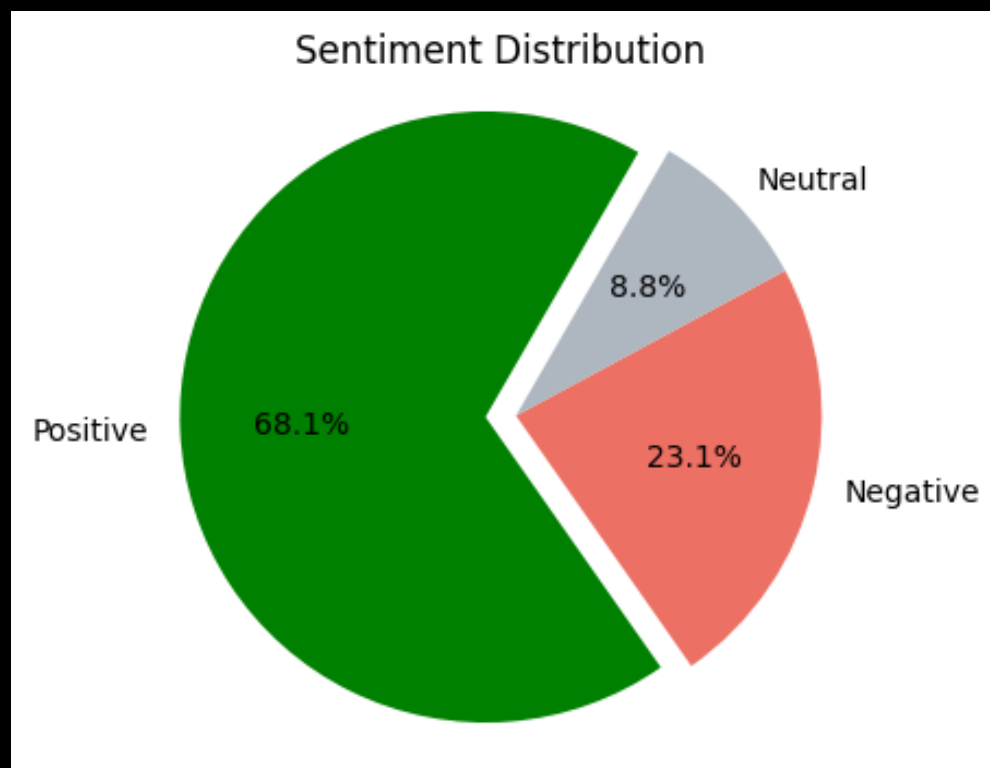


Anonymized data – confined to the dataset

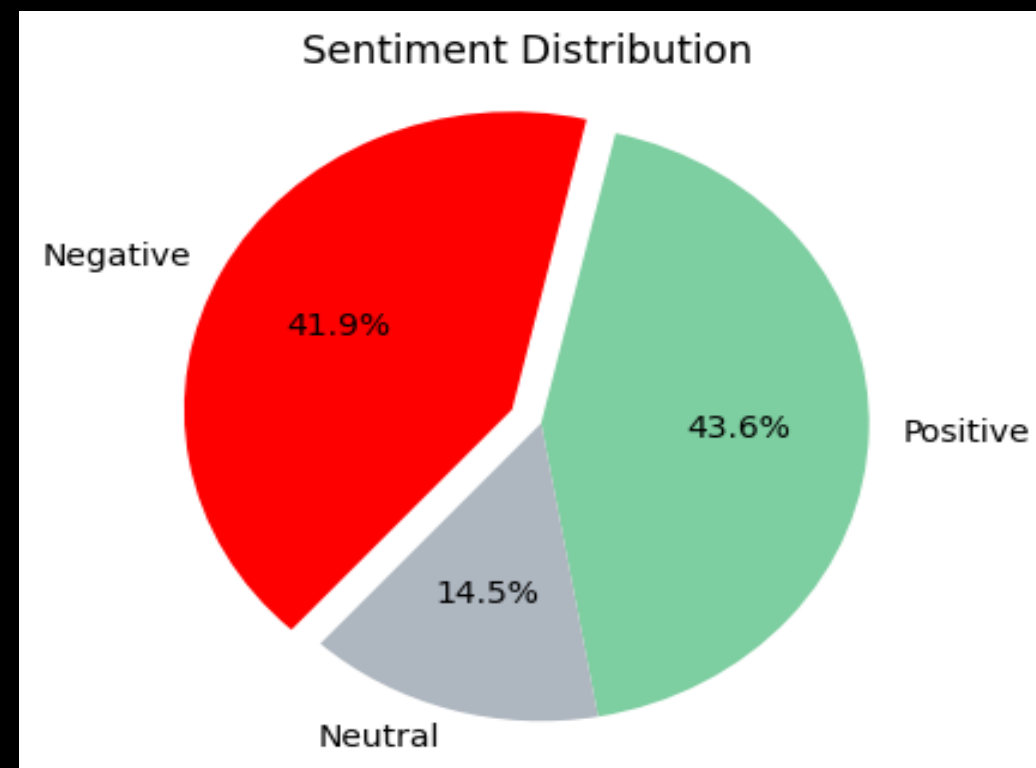
# STARLIGHT VS DREAMWORLD – CASE STUDY



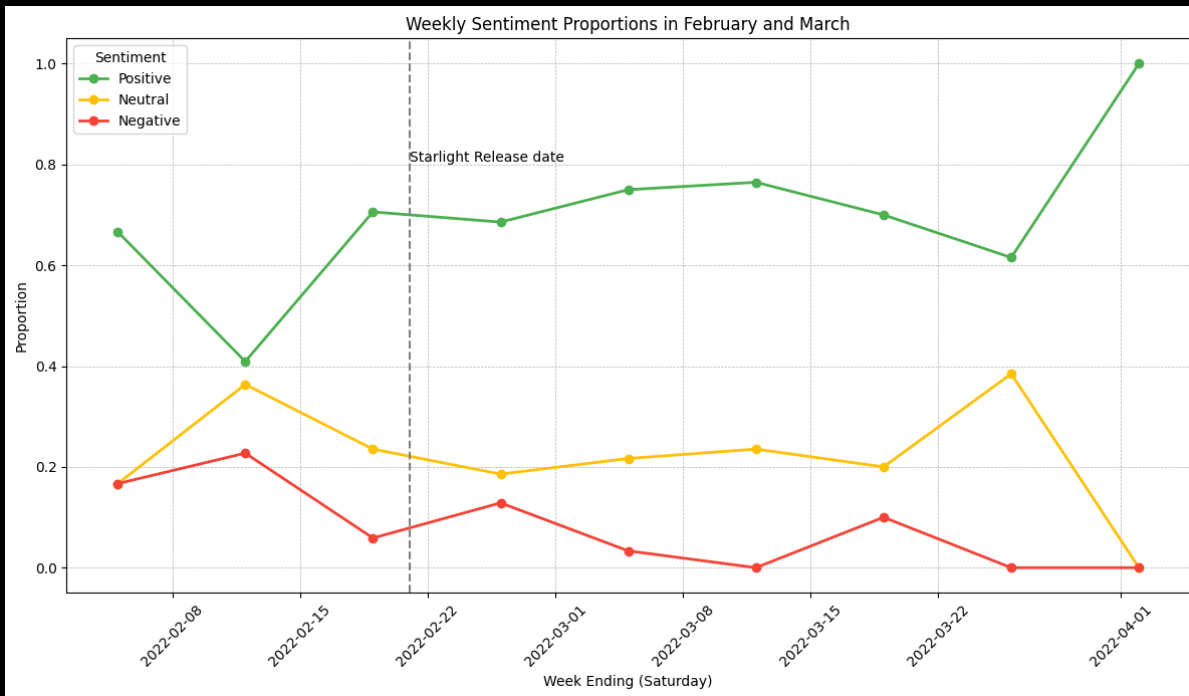
# STARLIGHT



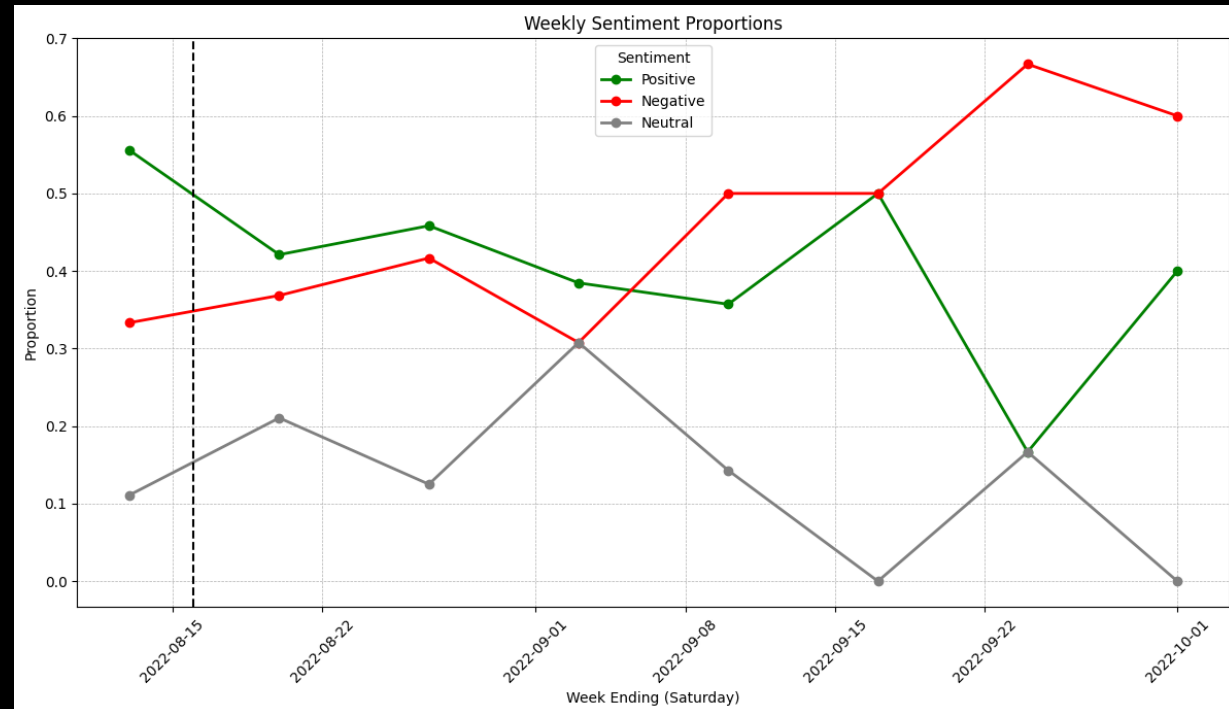
# DREAM WORLD



# STARLIGHT

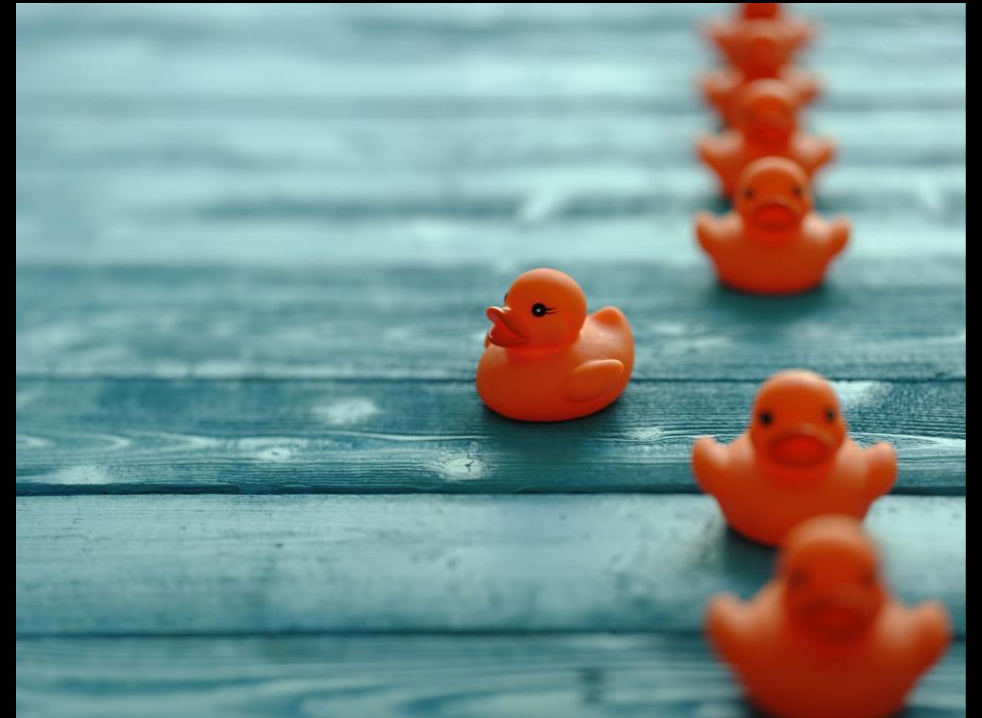


# DREAM WORLD



# TAKEAWAYS

- Modelling alone not enough for accurate forecasts
- Leverage Social Media Analytics & seek customer feedback
- Based on customer adoption and actual demand, recalibrate the forecasts based on risk appetite





THANK YOU !!





# APPENDIX

# AGENDA

- ✓ Business Problem & Project Objectives
- ✓ Project Assumptions
- ✓ Strategy
- ✓ Models Considered
- ✓ Model Selection & Validation
- ✓ Question 1 Findings
- ✓ Q1 Business Risk Evaluation
- ✓ Project Limitations
- ✓ Case Study – Analysis Post Product Launch

## QUESTION 2

**Item Description:** Sparkling Jacceptablester Avocado 11Small MLT

**Caloric Segment:**  
Regular

**Market Category:**  
SSD

**Manufacturer:**  
Swire-CC

**Brand:** Sparkling  
Jacceptablester

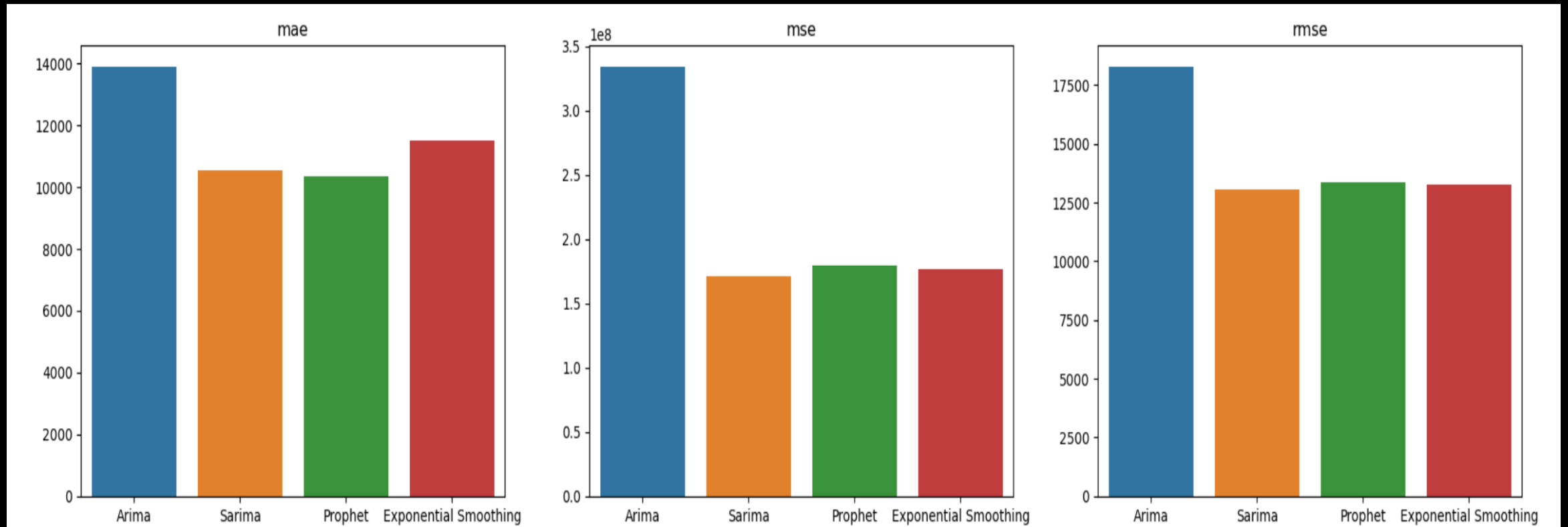
**Package Type:**  
11Small MLT

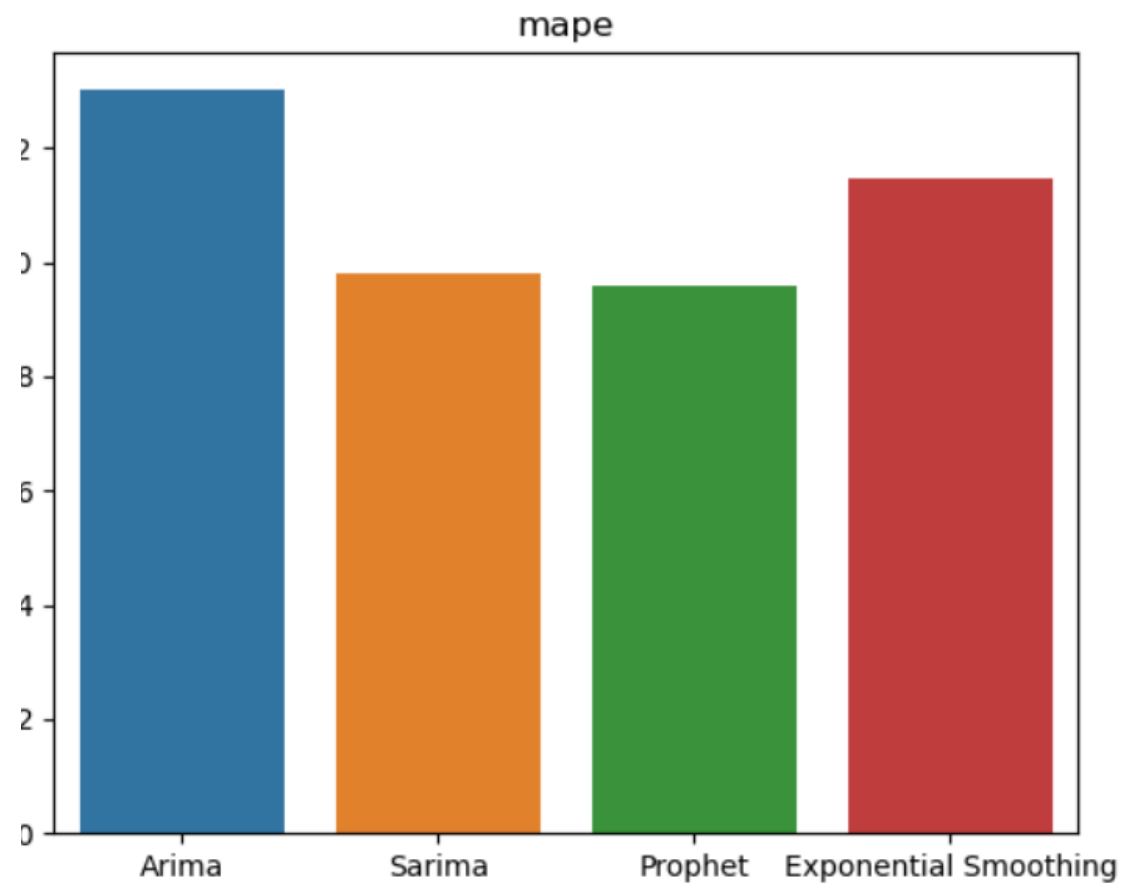
**Flavor:** 'Avocado'



Swire plans to release this product 2 weeks prior to Easter and 2 weeks post Easter. What will the forecasted demand be, in weeks, for this product?

# Q2 RESULTS





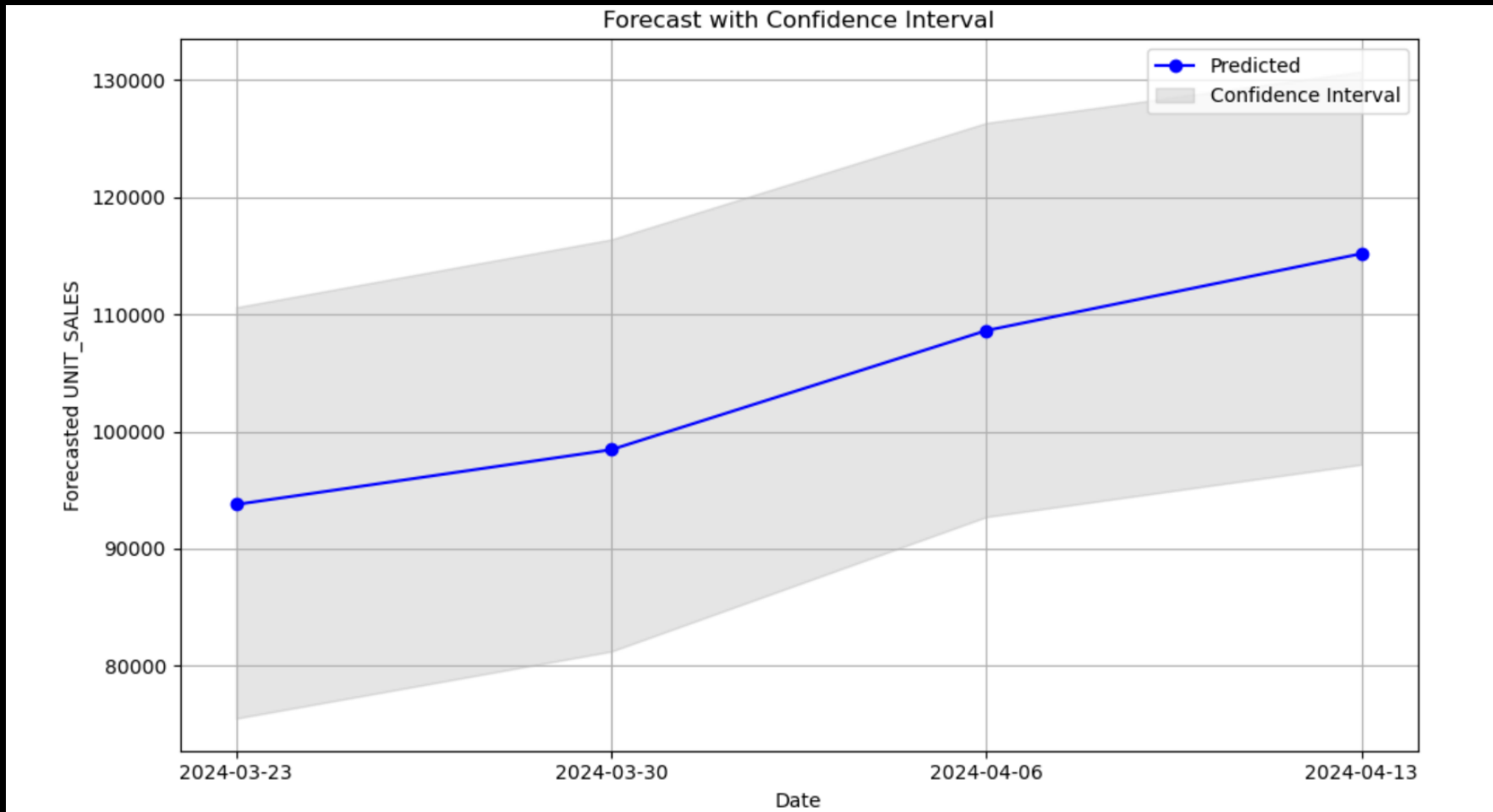
**Q2 RESULTS**

# Q2 FORECAST RESULTS

	yhat	yhat_upper	yhat_lower
DATE			
2024-03-23	93763.73	110608.42	75509.07
2024-03-30	98443.33	116404.55	81232.11
2024-04-06	108617.99	126353.05	92715.61
2024-04-13	115180.50	130721.01	97186.91



# Q2 FORECAST RESULTS



## QUESTION 3

**Item Description: Diet Venomous Blast Energy Drink Kiwano 16 Liquid Small**

**Caloric Segment:**  
Diet

**Market Category:**  
Energy

**Manufacturer:**  
Swire-CC

**Brand:** Venomous  
Blast

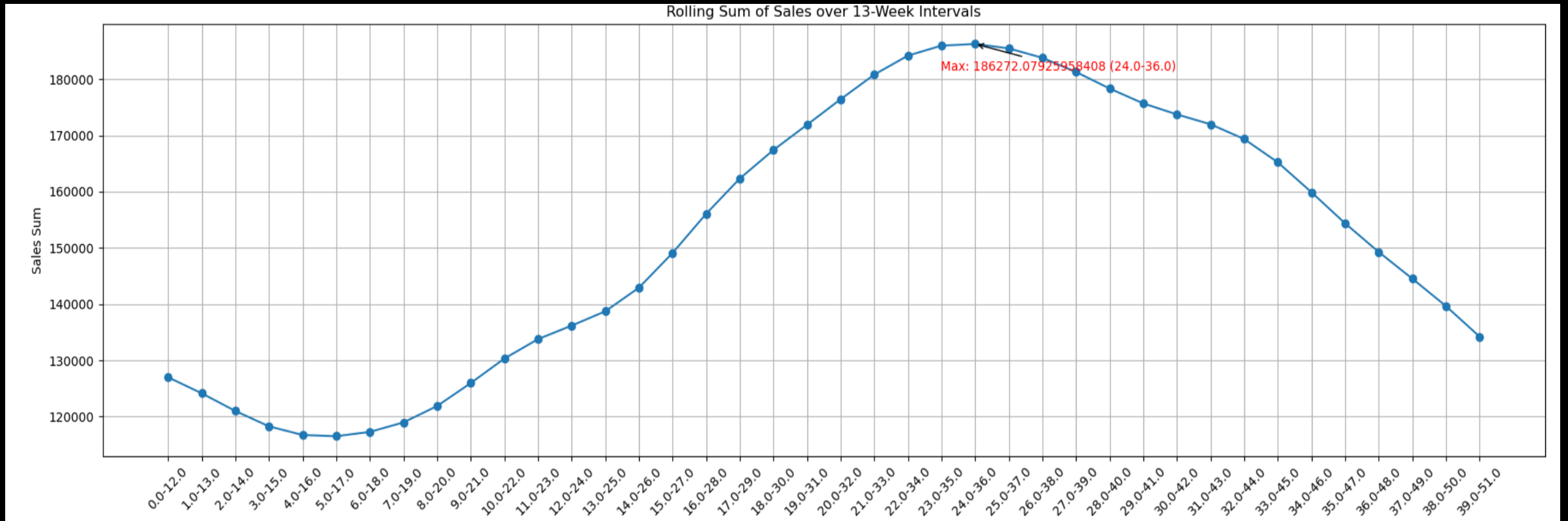
**Package Type:** 16  
Liquid Small

**Flavor:** 'Kiwano'



**Which 13 weeks of the year would this product perform best in the market? What is the forecasted demand, in weeks, for those 13 weeks?**

# Q3 MODEL VALIDATION



## QUESTION 4

**Item Description: Diet Square Mulberries Sparkling Water 10Small MLT**

**Caloric Segment:**  
Diet

**Market Category:**  
Sparkling Water

**Manufacturer:**  
Swire-CC

**Brand:** Square

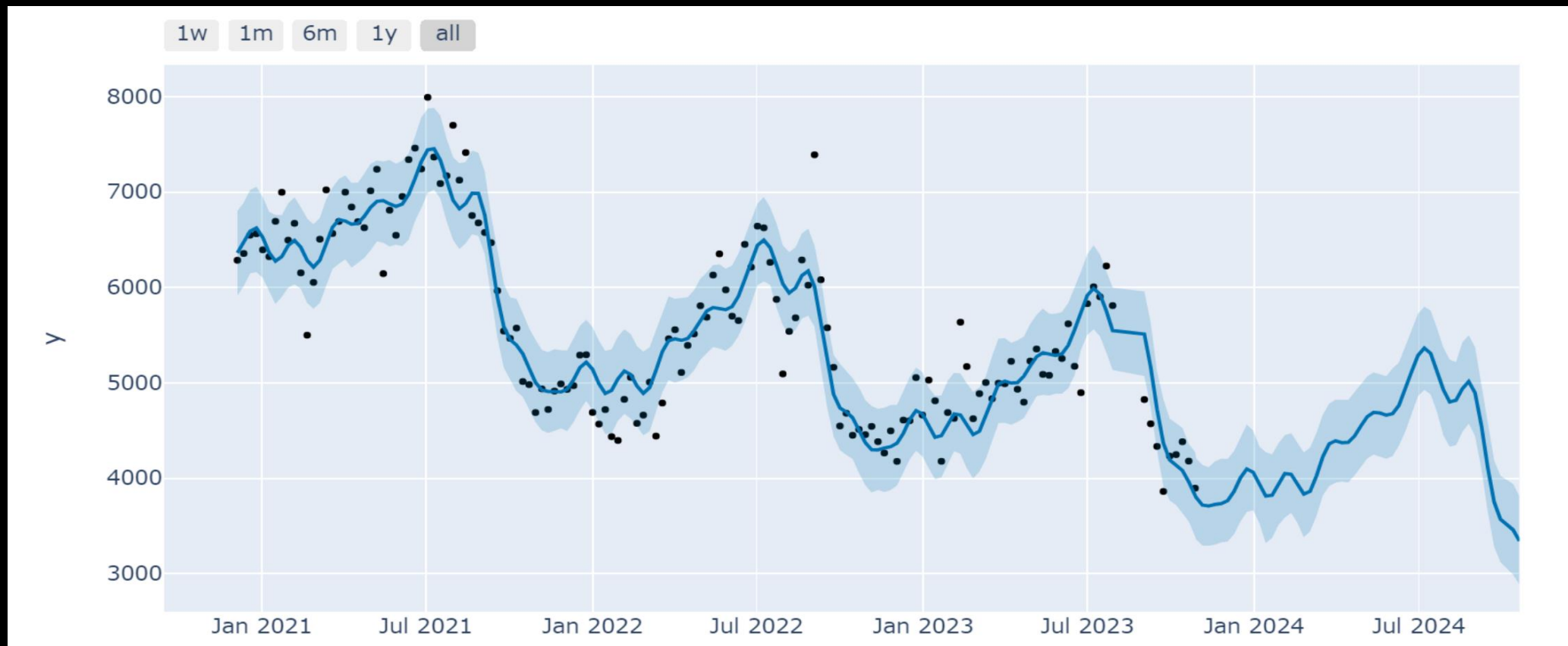
**Package Type:**  
10Small MLT

**Flavor:** 'Mulberries'

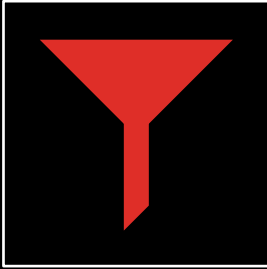


**Swire plans to release this product for the duration of 1 year but only in the Northern region. What will the forecasted demand be, in weeks, for this product?**

# Q4 PROPHET MODEL VALIDATION



# Q3 MODEL RESULTS



From our model, the maximum sales in the next one year is from week 24 to 36 whereas, our historical data have the highest sales from week 19 to week 31.



Our Forecasting demand range is similar to the range of already existing historical data demand, making our results valid and much more deliverable in the future.



The best 13 weeks for the forecasted year is week 24 to week 36 and the total unit sales is 186K



# Q4 SUMMARY



Observed dipping sales when Swire is taken into consideration. Swire has reduced significantly the sales of Mulberry flavor.



Considered Diet and Sparkling water and Mulberry which has a better sales of 223K in the forecasting year.



Swire has 13% of these sales, hence the total unit sales in the forecasted year is 29K.

## QUESTION 5

**Item Description: Greetingle Health Beverage Woodsy Yellow .5L 12One Jug**

**Caloric Segment:**  
Regular

**Market Category:**  
ING Enhanced  
Water

**Manufacturer:**  
Swire-CC

**Brand:** Greetingle

**Package Type:** 5L  
12One Jug

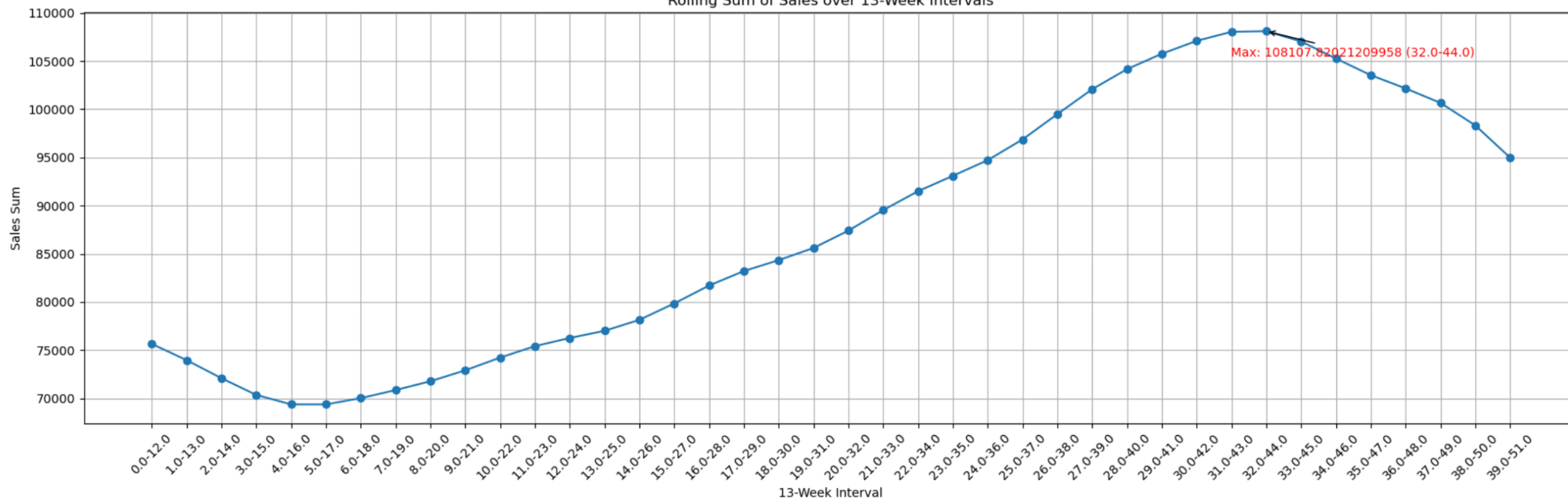
**Flavor:** 'Woodsy  
Yellow'



Swire plans to release this product for 13 weeks, but only in one region. Which region would it perform best in?

# Q5 MODEL VALIDATION

Rolling Sum of Sales over 13-Week Intervals



total\_fill\_control\_under\_weekly\_forecast\_data\_control\_under\_fill\_kat17\_sum()

# Q5 RESULTS

	Region	Filter	Best 13 Weeks (Forecasted)	Absolute Value (Unit Sales)	Absolute Value Percentage for total weeks
0	NorthWest	Brand + Category	29 - 41	300731	30.62%
1	Central	Brand + Category	25 - 37	272066	31.24%
2	NorthWest	Flavor + Caloric + Category	30 - 42	173096	30.98%
3	Central	Flavor + Caloric + Category	32 - 44	108107	31.14%

- Based on the values of both the filters, NorthWest constituting higher absolute sales. Hence, NW will be the final region.
- The product could be launched in Northwest region with expected sales for the forecasted year to be around 173k with the best 13 weeks is 30 - 42.

## QUESTION 6

### Item Description: Diet Energy Moonlit Casava 2L Multi Jug

**Caloric Segment:**  
Diet

**Market Category:**  
Energy

**Manufacturer:**  
Swire-CC

**Brand:** Diet  
Moonlit

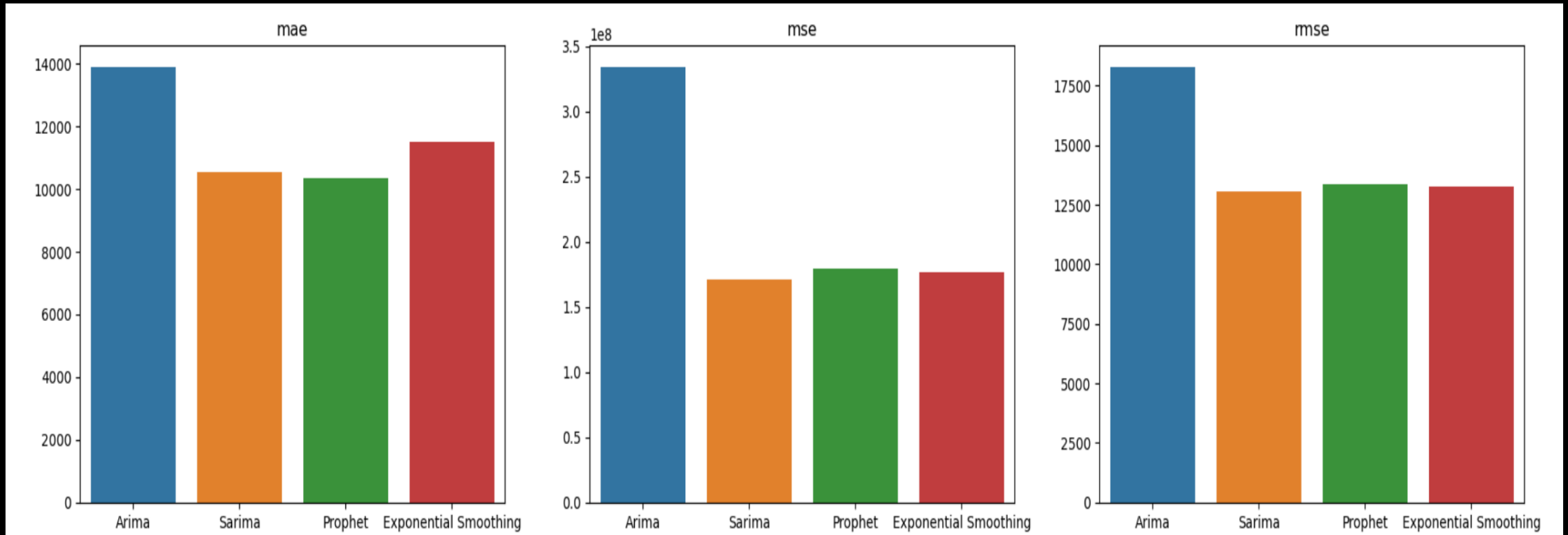
**Package Type:** 2L  
Multi Jug

**Flavor:** 'Cassava'

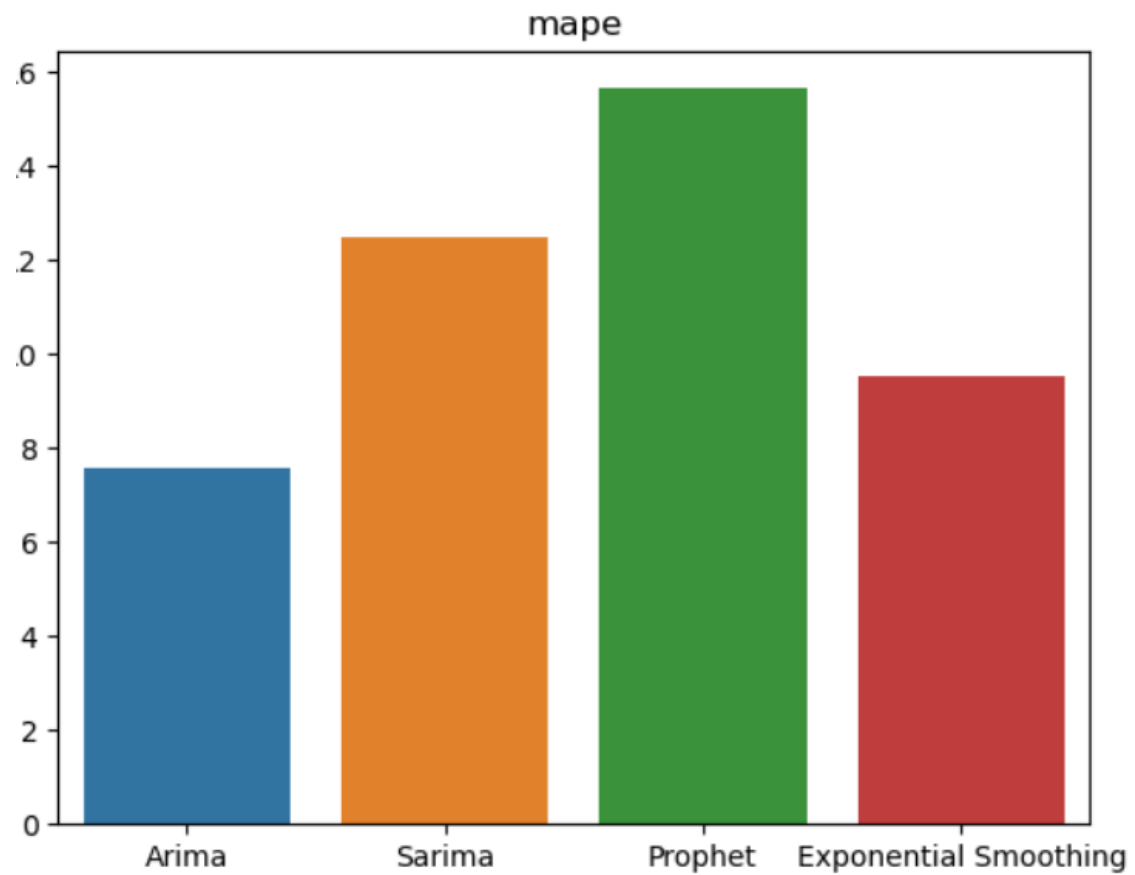


Swire plans to release this product for 6 months. What will the forecasted demand be, in weeks, for this product?

# Q6 RESULTS

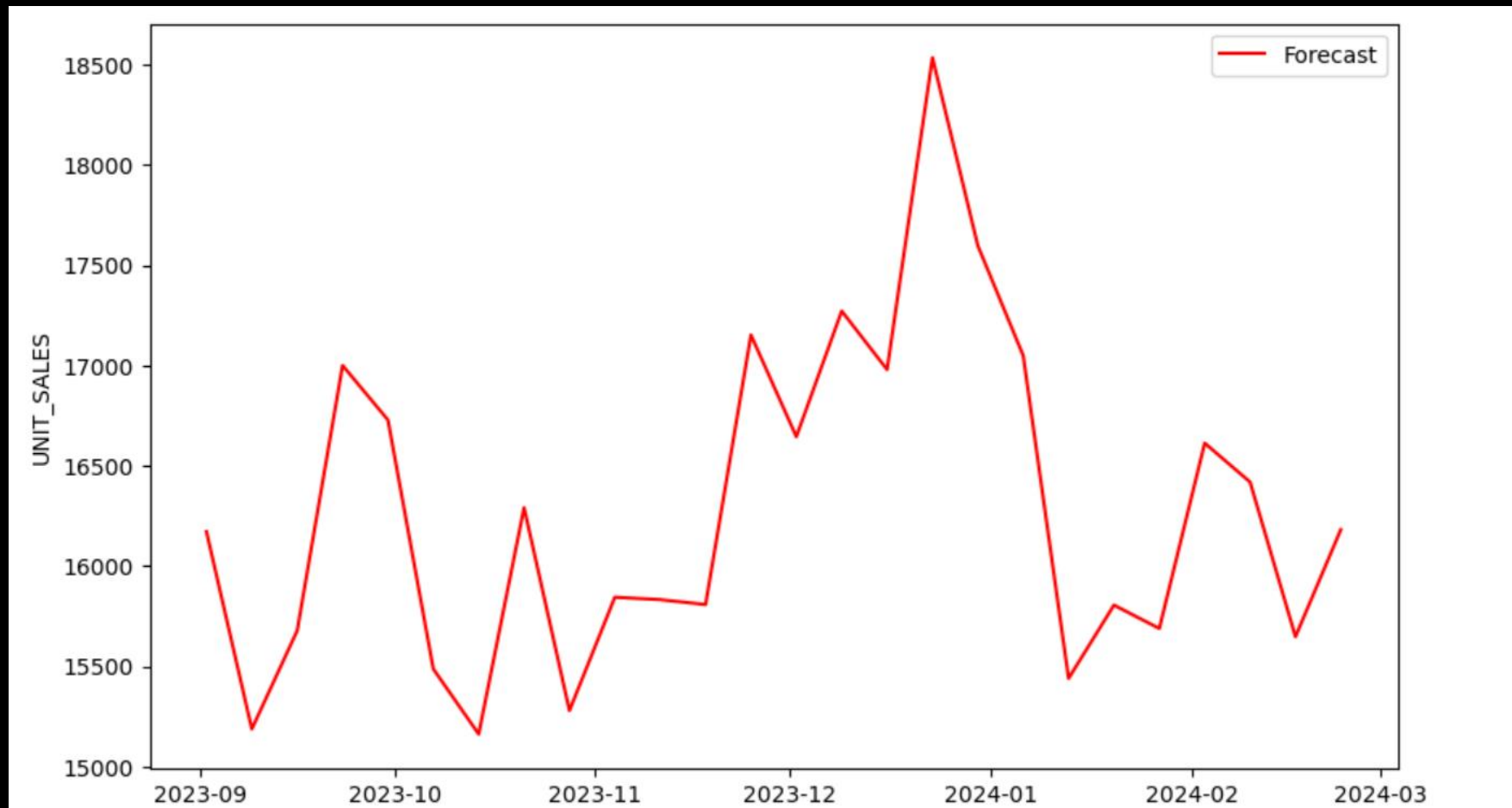






**Q6 RESULTS**

# Q6 FORECAST RESULTS



## QUESTION 7

### Item Description: Peppy Gentle Drink Pink Woodsy .5L Multi Jug

**Caloric Segment:**  
Regular

**Market Category:**  
SSD

**Manufacturer:**  
Swire-CC

**Brand:** Peppy

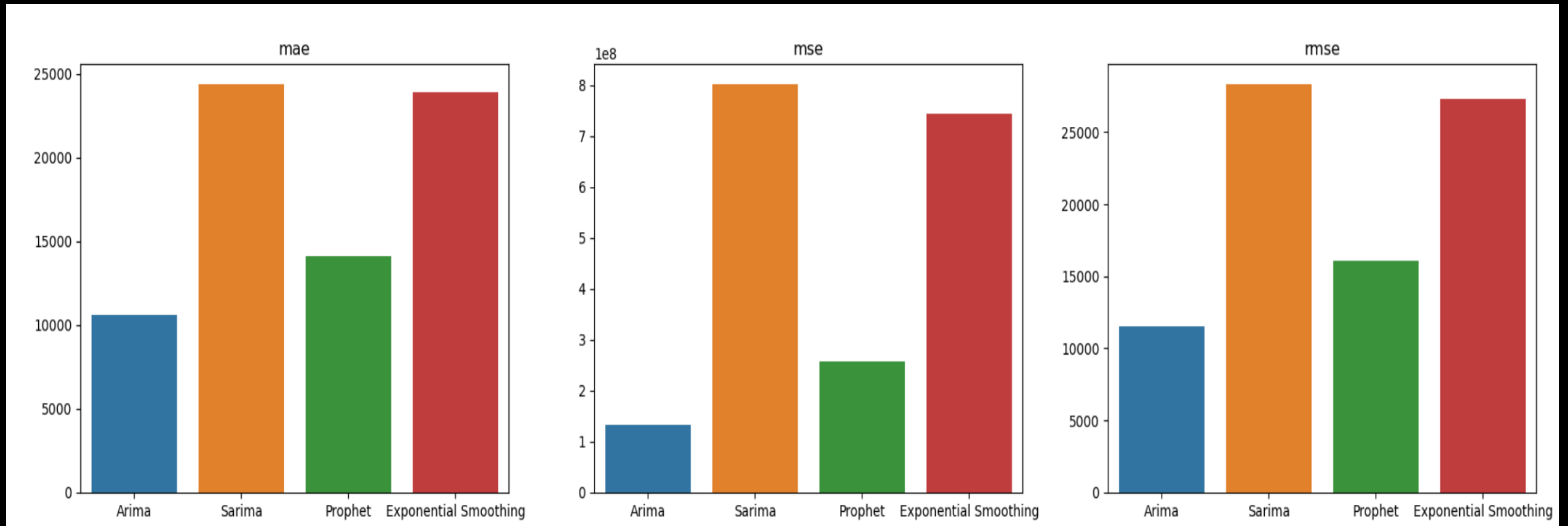
**Package Type:** 5L  
Multi Jug

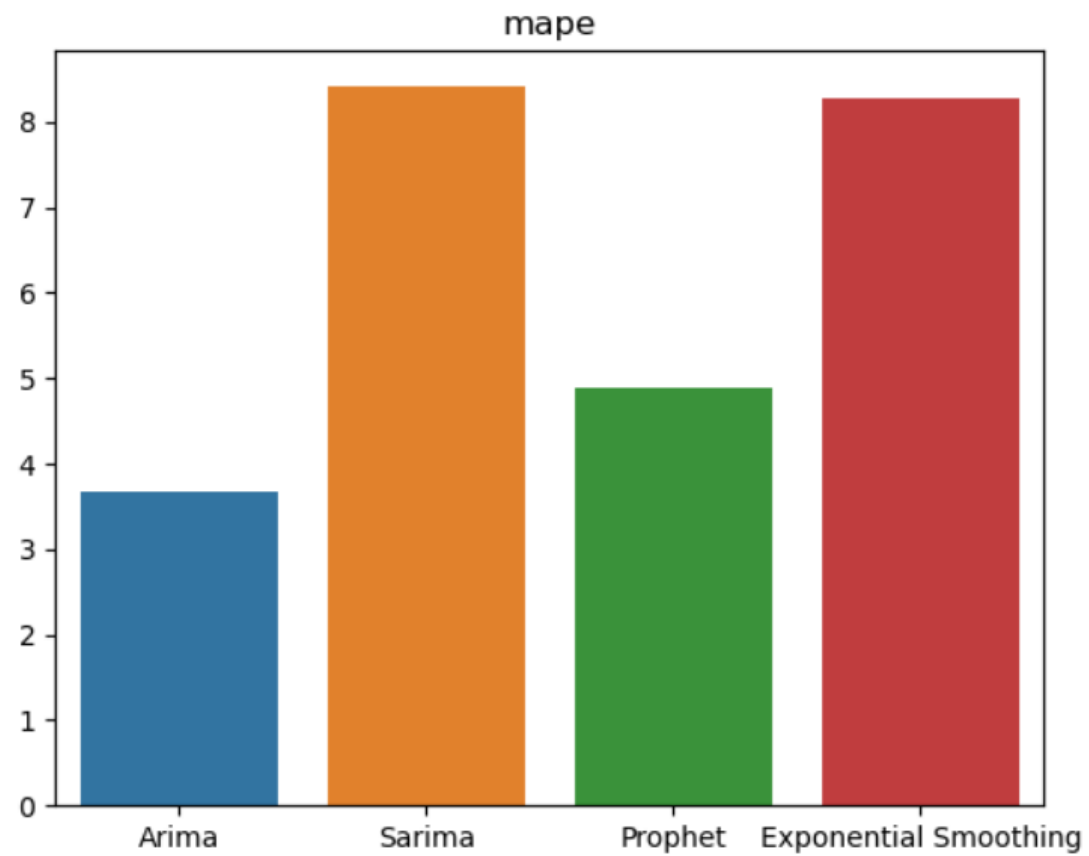
**Flavor:** 'Pink  
Woodsy'



Swire plans to release this product in the Southern region for 13 weeks.  
What will the forecasted demand be, in weeks, for this product?

# Q7 RESULTS





**Q7 RESULTS**

# Q7 FORECAST RESULTS

