

Report: Multiple Views

By: Emi Neuwalder, Elaine Demetron and Liberty Lehr

Introduction

The theme park, DinoFun World, Scott Jones Memorabilia Exhibit at the park's pavilion fell victim to a criminal act. Law enforcement is still trying to better understand the inner mechanics of the crime. In our research we found evidence that may help clarify some of the missing details.

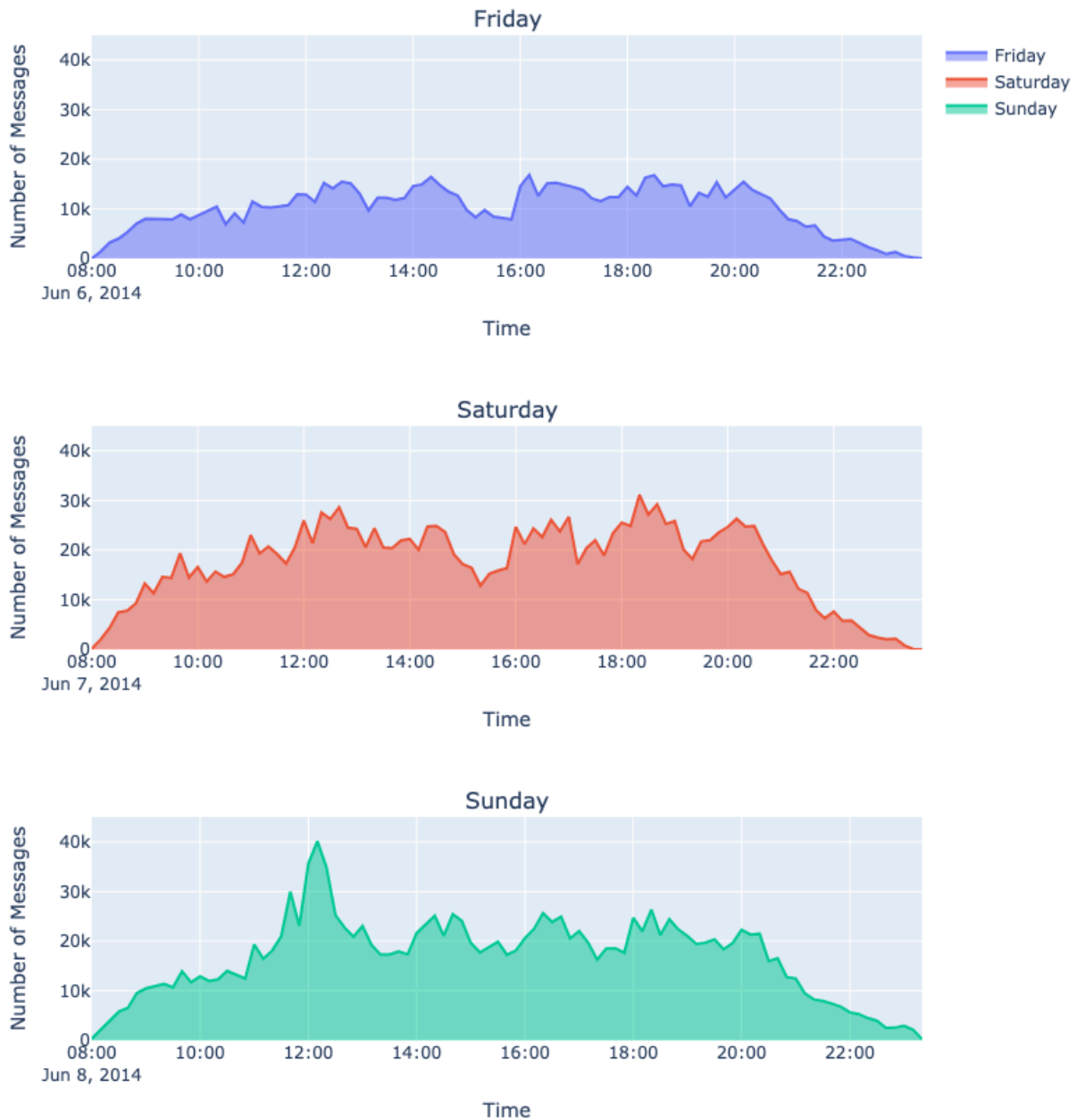
Our evidence can support the following inferences:

1. The crime occurred on Sunday at noon.
2. The reporting line for DinoFun World is 839736.
3. There was suspicious activity in the Wet Lands and the Entry Corridor on Sunday at noon.
4. People crowded into Coaster Alley at 11am.

When did the crime take place?

Hypothesis 1a: The crime took place on Sunday.

Frequency of Messages Per Ten Minutes (Friday to Sunday)

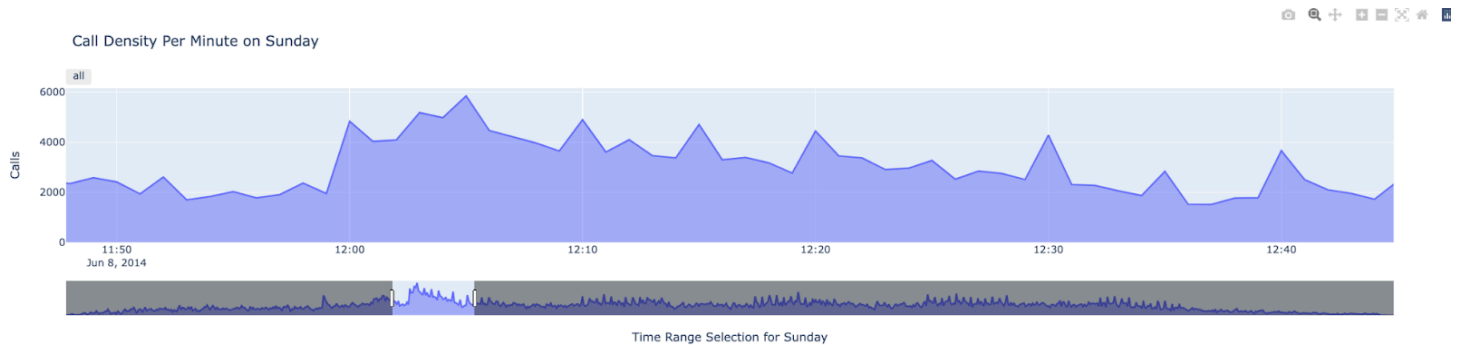


[Fig. 1] The frequency of messages over ten minute periods for Friday, Saturday and Sunday.

In the multiple density plots above we can see the frequency of messages every ten minutes for each day of the week. It is clear that there were visibly more messages than any other day. This

abnormally high amount of messages indicates that an important series of events occurred on Sunday.

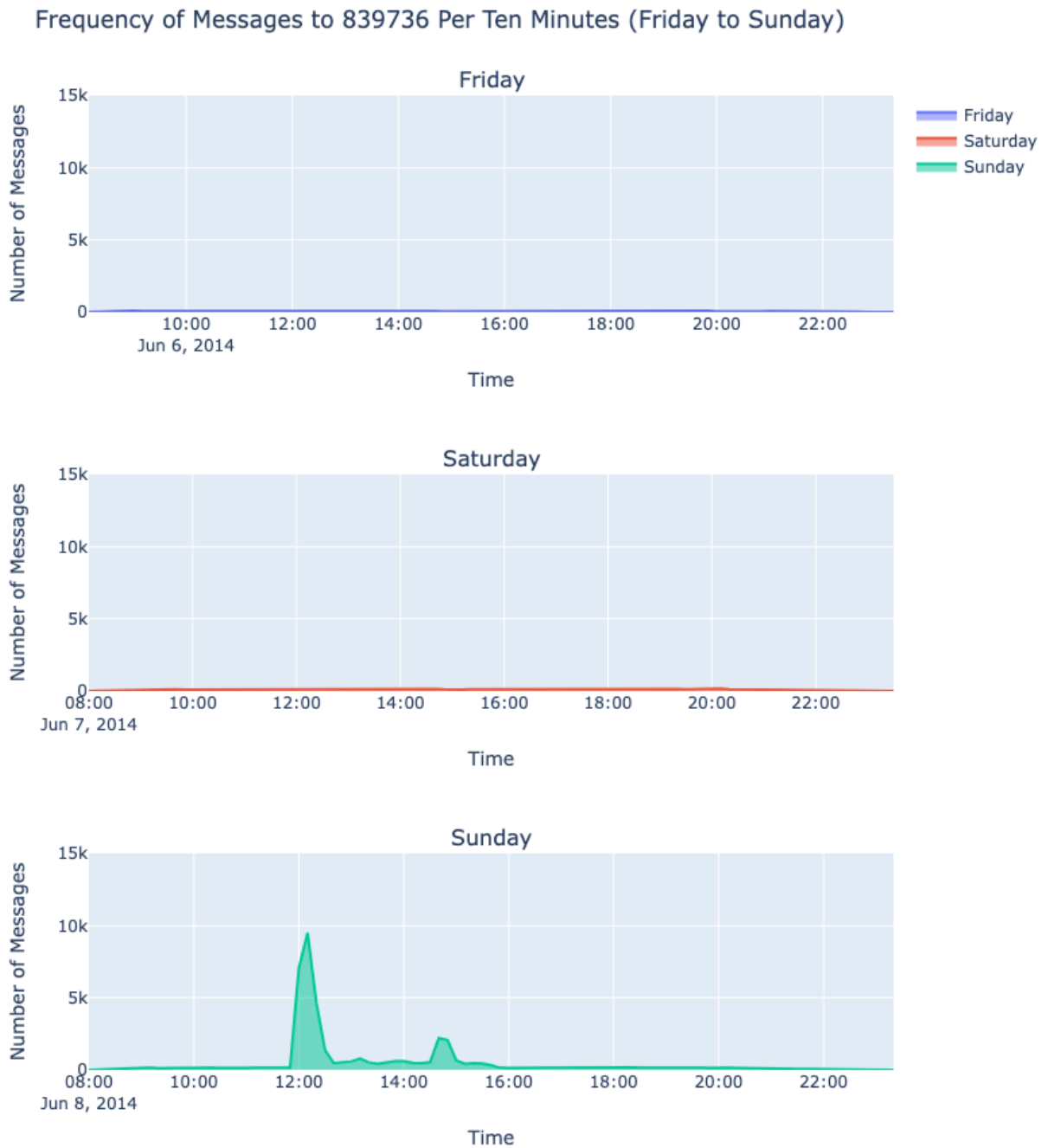
Hypothesis 1b: The crime took place at noon.



[Fig. 2] The frequency of messages over one minute periods on Sunday with the time range 11:50 am to 12:40 pm selected.

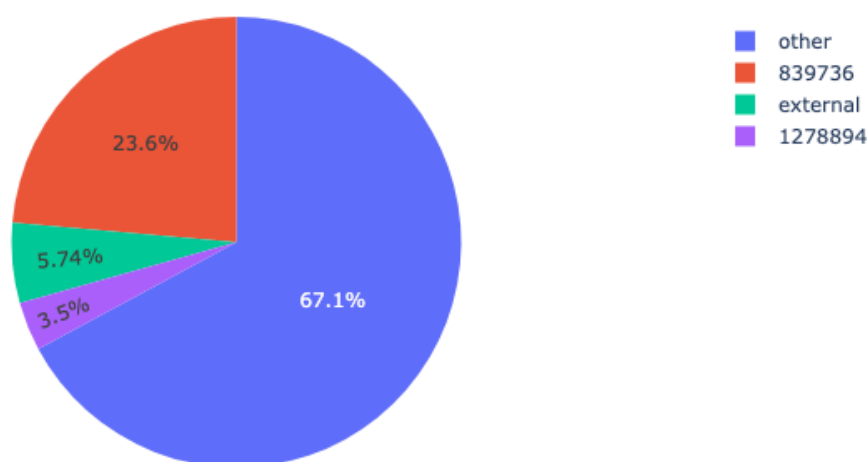
Here we can see a zoomed in view of the time period showing the message spike. This portion of the graph exhibits a clearly multimodal distribution of messages which may indicate multiple noteworthy activities related to the crime took place in this time.

Hypothesis 2: The reporting line for DinoFun World is 839736.



[Fig. 3] The frequency of messages to 839736 on Friday, Saturday, and Sunday.

Top Receivers of Messages from Wet Land, Sunday 11:30am-12:30pm



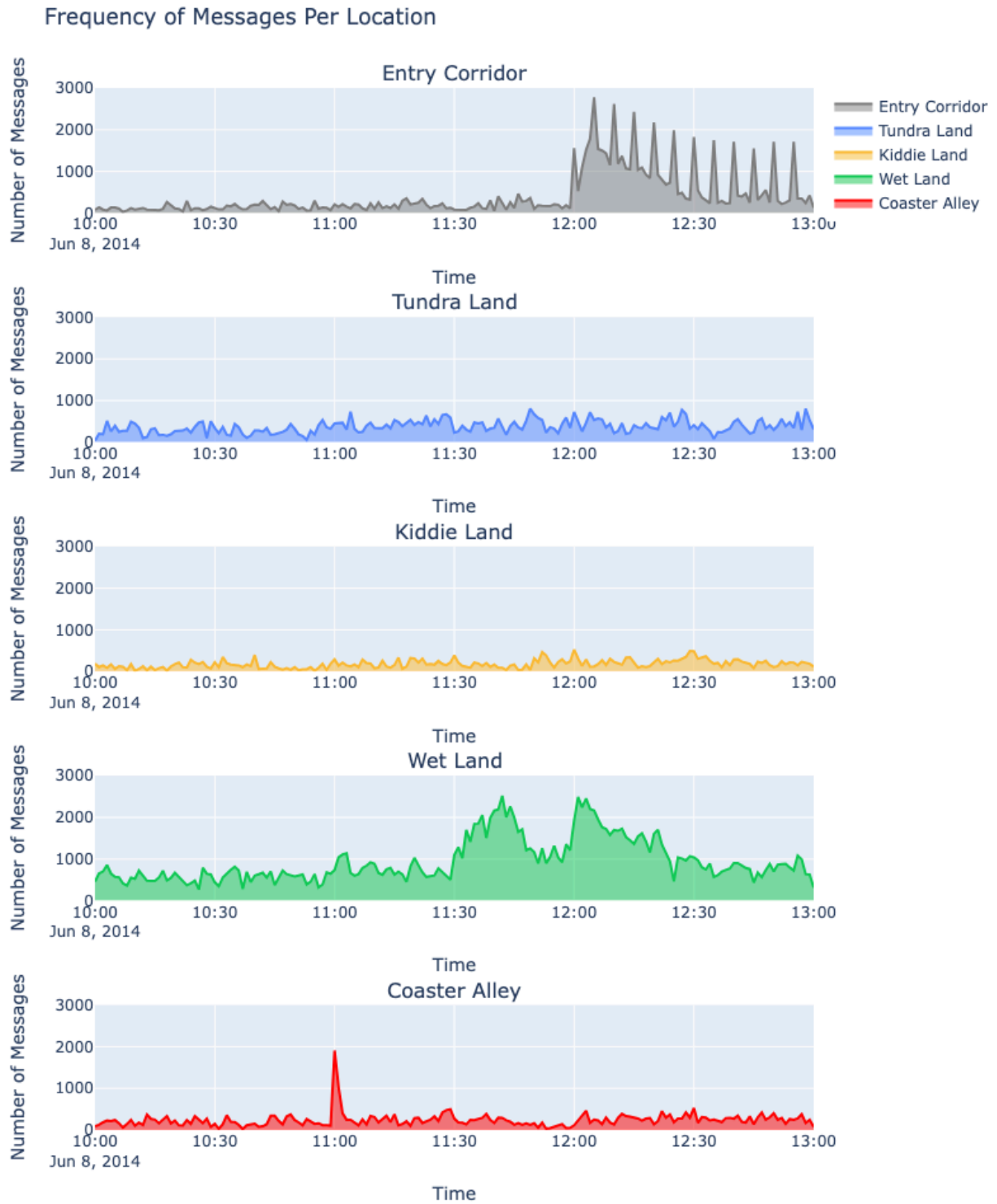
[Fig. 4] The percentage of messages arriving from Wet Land to the ID 839736 compared to other recipients during 11:30am-12:30pm on Sunday

As we can see in Figure 4, at the time and location that we have assumed the main event of interest to take place, 23.6% of outgoing messages went to one number, 839736. Additionally, there is no movement data for this ID number. As we can see in Figure 3, there is a spike in messages to ID 839736 at noon on Sunday, correlating with the spike in total messages sent in Figures 1-2. Putting this together, it would make sense that 839736 is a reporting number, which saw a lot of activity at the time of the crime, with no person attached to it to provide movement data. Interestingly, there is another smaller spike at around 2:45pm on Sunday, and this could warrant further investigation.

Additionally, Figure 3 helps to pinpoint and confirm the time of the crime by separating out an increase in incidence reports from the natural rise and fall of message frequency.

Where did the crime occur?

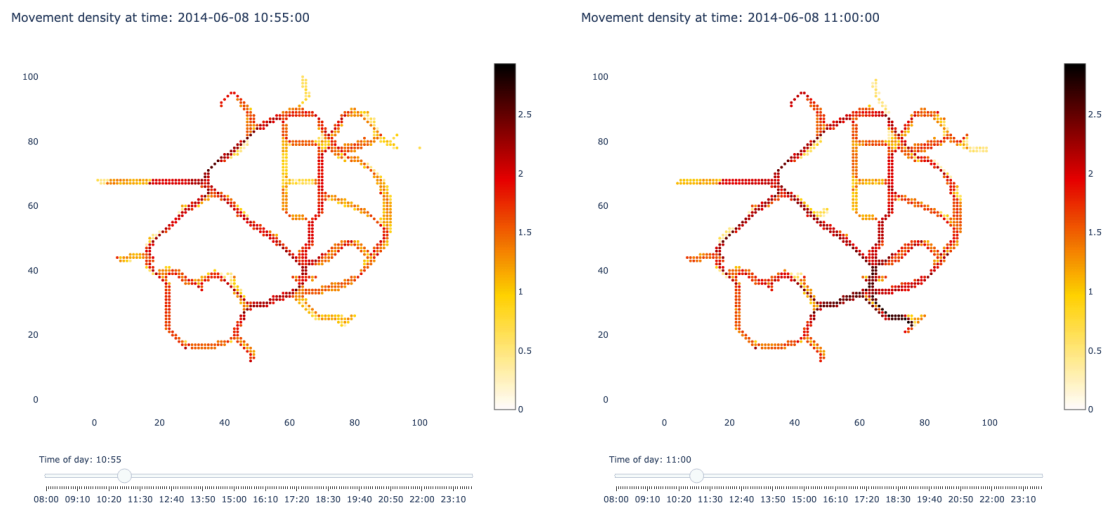
Hypothesis 3: Suspicious activity occurred in the Wet Lands and the Entry Corridor.



[Fig. 5] The frequency of messages per location in DinoFun World during Sunday from 11 am to 1pm.

Since we knew that the crime occurred in the Creighton Pavilion which is in between Coaster Alley and Wet Land we hypothesized that messages would be most frequent in those places. In the visualization above we can see that more messages were made in Wet Land and Entry Corridor than Kiddie Land, Tundra Land, or Coaster Ally. This demonstrates that the criminal activity must have taken place in Entry Corridor and Wet Land.

Hypothesis 4: Something occurred in Coaster Alley at 11am.



[Fig. 6-7] Crowd density around 11am.

Looking at Figures 6-7, we see a large influx of people into Coaster Alley area at 11am. Then, looking at Figure 5, there is clearly a spike in messages in Coaster Alley at 11am Sunday, that does not correlate to a spike in messages to the hypothesized report line (refer to Figure 3). This could just mean that an entrance near Coaster Alley has an opening time of 11am, or could imply that some organized group, potentially related to the crime an hour later, met up in that location.

Recommendations

1. **Investigate Coaster Alley influx at 11am Sunday:** Following Hypothesis 4, investigate who was in Coaster Alley at 11am on Sunday. Track these ID numbers throughout the day and pay attention to whether any of the IDs were near the Pavillion before noon.
2. **Investigate ID 1278894:** Looking at Figure 4, we see that ID number 1278894 also made up a significant number of message recipients from the Wet Lands on Sunday around noon. Track this ID number throughout the day on Sunday and map their locations. Check if there are any patterns in who was communicating with them.
3. **Confirm that 839736 is the reporting line:** Confirm Hypothesis 2 by talking to amusement park management.
4. **Investigate who/where sent messages to 839736 on Sunday at 2:45pm:** Looking at Figure 3, we see a smaller spike of messages sent to the reporting line at 2:45pm on Sunday, indicating a subsequent criminal incident. The location of the message senders would reveal where this second incident took place.