Detroit Police Department: PATROL RESOURCE MANAGEMENT

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Our goal was to demonstrate how Detroit's non-priority 1 call patterns and unit deployments drive response times, why Precincts 3 and 8 reveal a critical imbalance, and what actions can rebalance workload without new spending.

Wayne State University
DSA 7500
July 26, 2025

Video Overview

Value Statement

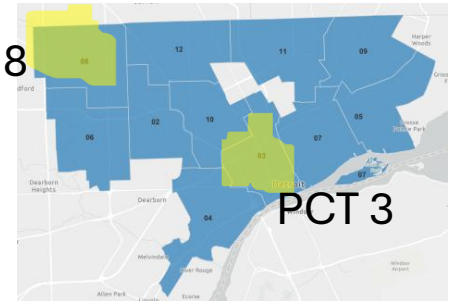
Goal: to provide data-informed guidance to help DPD command staff enhance patrol deployment strategies, evaluate resource distribution, and support operational decision-making.

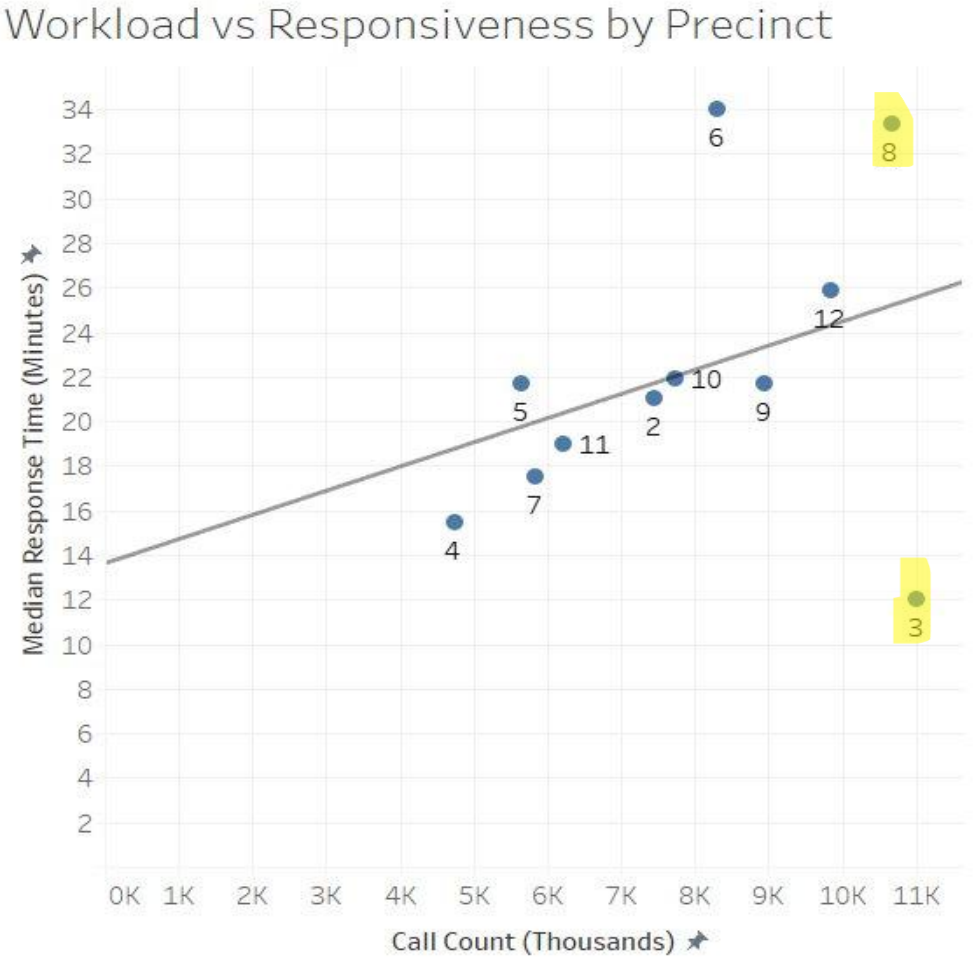
Achieved by:

- Developed a diverse range of dashboards to filter client requests.
- Learning client systems and collaborating with client on topic and dashboard revisions.
- Using Tableau to match client systems and templates.
- Discussing with client what they are most interested in vs what they are not.
- Building two main interactive Tableau dashboards that synthesize 911 call records, dispatch activity, scout car, and vehicle data.

Key Activities/Approaches

- The chart to the right was used as the basis for determining our analysis approach.
  - We noticed that **precincts 3 and 8** had similar workload (# of calls), but the median response times differ greatly, with precinct 3 having the best response time and 8 having amongst the worst.
  - A **comparative analysis** on precincts 3 and 8 was then decided upon as the project's direction.
- Methods & Technologies used to perform comparative analysis include:
  - **Data visualization** – Charts, maps , and graphs using **Tableau.**
  - **Calculated fields** – Made custom formulas based on visualization needs.
  - **Story-telling approach** - Focused on creating cohesive, connected visualizations to effectively communicate key insights and uncover a compelling narrative within the data.





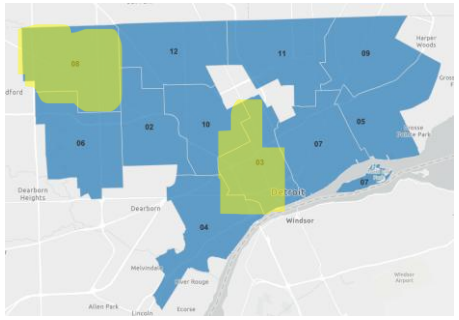
Precincts 3 and 8: Assist Demand vs. Deployment Patterns (April)

Assist-Penalty Heatmap

Caller Precinct

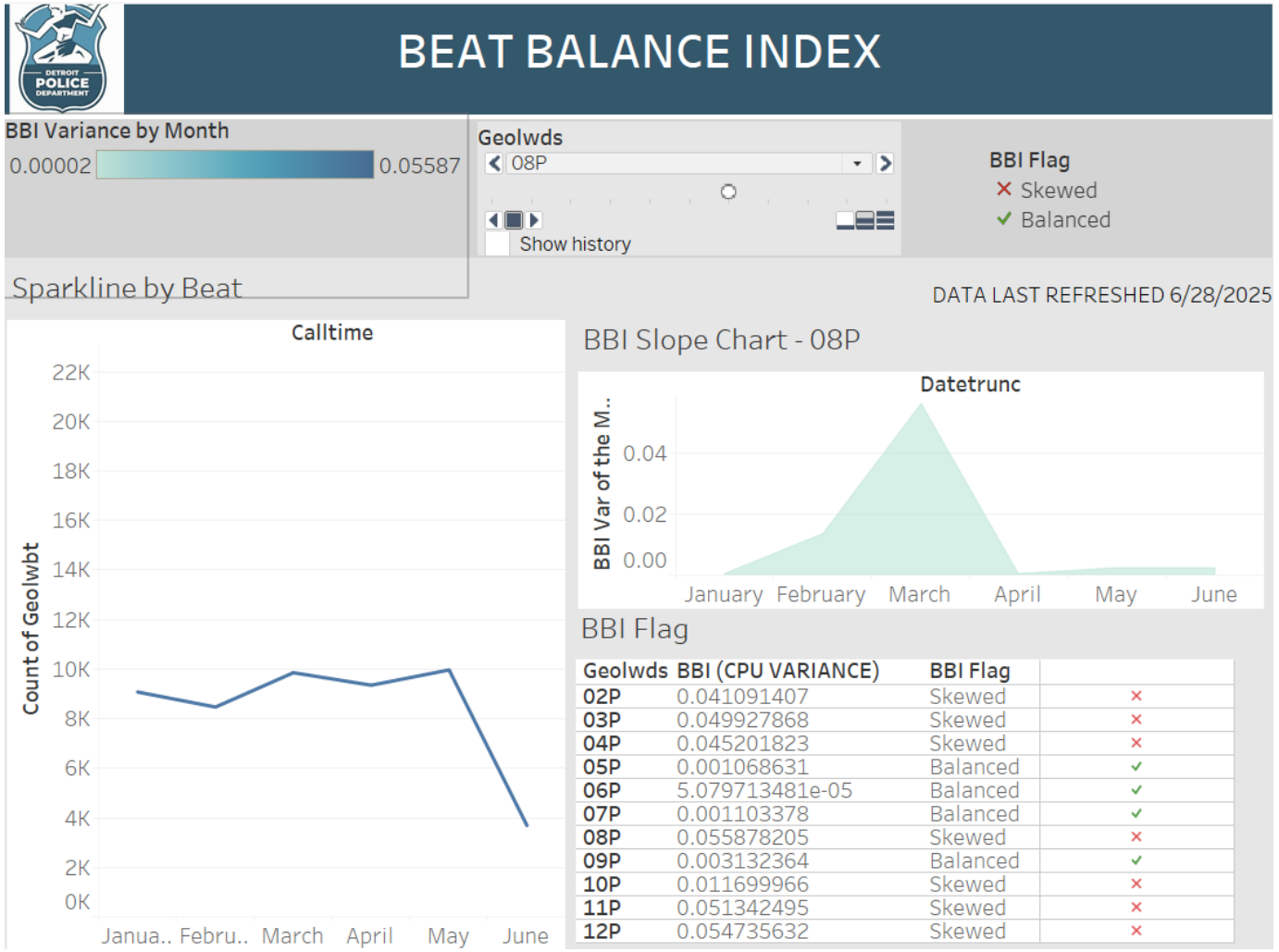
Unit Precinct	2	3	4	5	6	7	8	9	10	11	12
2	9,214	19,239	15	30	26	14	21	20	43	28	69
3	9,223	19,241	15	6,697	26	9,374	9,562	9,548	43	9,719	9,184
4	26	19,242	6,932	30	19	14	17	20	41	27	27
5	9,188		1	6,660	7	5	4	9,523	6	3	42
6	34	19,242	6,932	30	8,901	14	26	20	42	28	9,125
7	26	19,241	14	6,697	19	9,374	17	20	37	27	27
8	29	19,239	14	30	8,901	14	9,555	20	38	28	33
9	26	19,239	14	6,690	19	19	17	9,543	37	29	27
10	4	7						5	7,634	9,689	13
11	26	19,241	14	6,697	19	9,374	17	9,548	37	9,716	40
12	7						6			1	9,097

7	19,241	17
8	19,239	9,545
9	19,239	17
10	7	
11	19,241	17
12		6

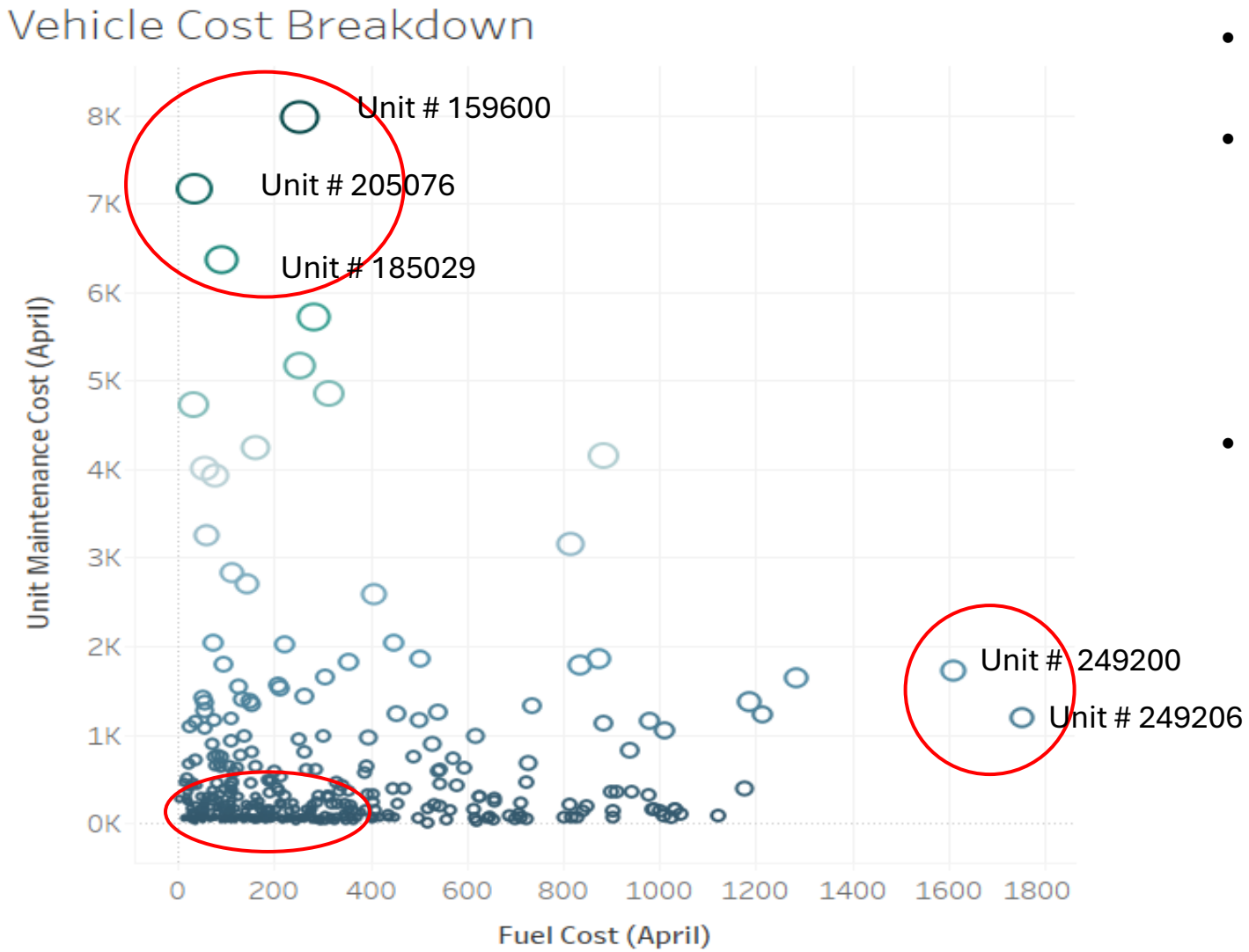


Monitoring Beat Workload Balance Across Precincts

- Sparkline by Beat: shows Calls per Unit across Beats within each Precinct.
- BBI Flag: quickly identifies which precincts have a balanced vs skewed workload across their beats, helping managers focus on areas that might need resource adjustments.
- BBI Slope Chart: visually track how balanced or skewed each precinct's beat workload is over time — and whether it's improving, declining, or staying stable.



Vehicle Cost Analysis (Fuel + Maintenance)



- Fuel costs Vs. Maintenance costs. Each plot represents a unit (scout car).
- Highlights vehicles where maintenance costs substantially exceeds fuel costs.
  - Vehicles with such operational issues should either be given more attention to provide more permanent repairs or look to replace vehicles if the budget allows.
- The lower left of the plot shows where a large concentration of scout cars lie, being between the $0 - $500 range for maintenance costs, and $0 - $400 range for fuel costs.

Total Deployment Cost

April Vehicle Count	1,136
April Fuel Cost	236,487
April Unit Maintena..	212,023
Total Vehicle Cost	448,510
Cost Per Vehicle	395

Key Insights/Findings

- Precincts 3 and 8 managed similar call volumes, but Precinct 3 sustained lower delays through dual-platoon staffing and wider unit coverage.
- Precinct 8 experienced the city’s highest delays, limited by a single platoon and fewer daily units.
- Assist analysis shows Precinct 3 as the top recipient of external support, including over 19,200 assists from Precinct 8 alone in April.
- A small number of vehicles (e.g., Unit 159600) showed high maintenance costs with low fuel usage, signaling inefficiency or overrepair.
- Several Precinct 3 vehicles had low deployment but high out-of-service time. These could be reassigned to support high-demand precincts like 8.

Future Work

- **Call Closure Timing:** Examine how long it takes for calls to be closed in the system and whether there are delays during shift or platoon transitions.
- **Out-of-Service Pattern Analysis:** Analyze how long scout cars remain out of service and identify patterns by time of day (especially midday), day of week, or staffing levels.
- **Out-of-Service Reason Prioritization:** Work with DPD to determine which Out-of-Service codes reflect actual operational disruptions versus routine or low-risk statuses.

Thank you & Questions

Thank you to Professor Yanchao Liu, Associate Professor in the Department of Industrial and System Engineering at Wayne State University & the Detroit Police Department for an insightful and challenging project. We all have learned tremendously from this experience.

QUESTIONS?

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