MOTOR VEHICLE THEFTS ANALYSIS

By Vincent Chien

Source: Kaggle – NZ Crime Chronicles: Motor Vehicle Theft Dataset

VARIABLE DESCRIPTIONS

Main Table : stolen_vehicles

- **vehicle_id** – Unique ID
- **vehicle_type** – Type of vehicle
- **make_id** – Links to make details
- **model_year** – Vehicle year
- **vehicle_desc** – Vehicle model/series
- **color** – Vehicle color
- **date_stolen** – Date stolen
- **location_id** – Links to location table

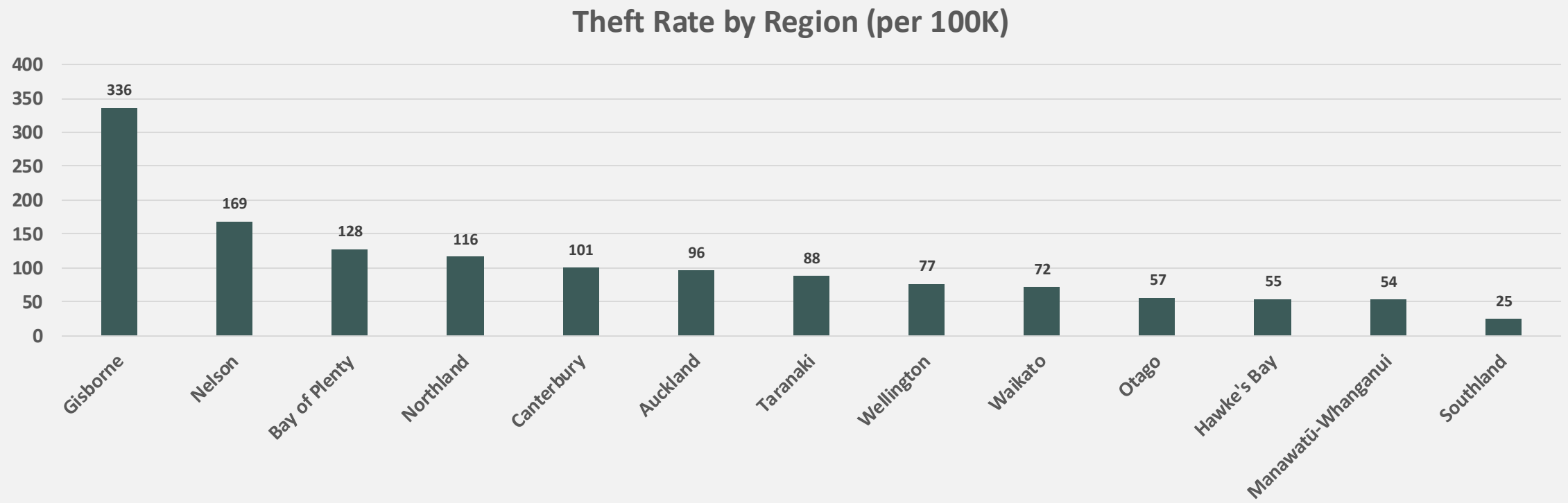
Supporting Tables : make_details, locations

- **make_name** – Vehicle make
- **make_type** – Standard or Luxury
- **region** – Region name
- **country** – Country (New Zealand)
- **population** – Region population
- **density** – Population per km²

BUSINESS GOALS

- **Identify High-Risk Locations**
  Detect regions with the highest theft rates to strengthen patrols and improve preventive measures.
- **Analyze Theft Trends Over Time**
  Track yearly and monthly patterns to identify when thefts increase or decline.
- **Evaluate Vehicle Risk Factors**
  Identify which vehicle brands and types face the highest theft risk to guide insurance and prevention strategies.
- **Assess Environmental & Demographic Correlates**
  Examine how vehicle theft rates vary across population density and regional characteristics.

LOCATIONS→
WHICH REGIONS REQUIRE STRONGER PROTECTION?

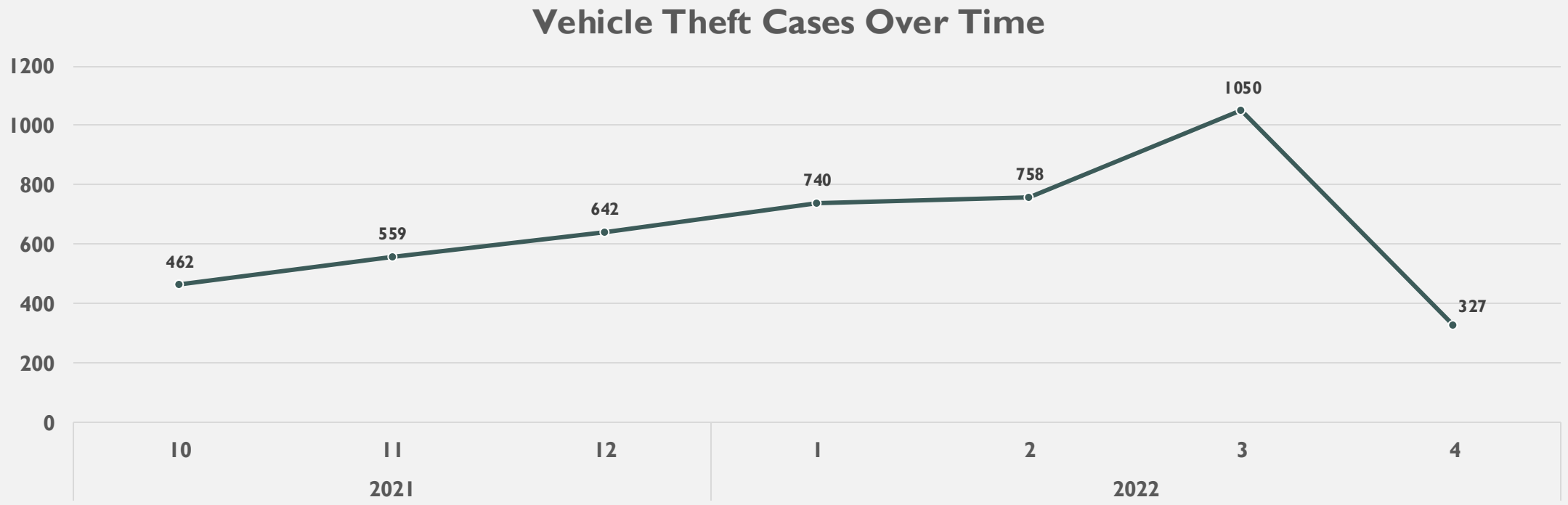


📍 Gisborne → highest theft rate → increase patrols & strengthen preventive measures

🧭 Southland → lowest theft rate → benchmark for effective theft-prevention practices

⚖️ Focus on reallocating resources between high- and low-risk regions

TIME →
HOW ARE VEHICLE THEFTS CHANGING OVER TIME?

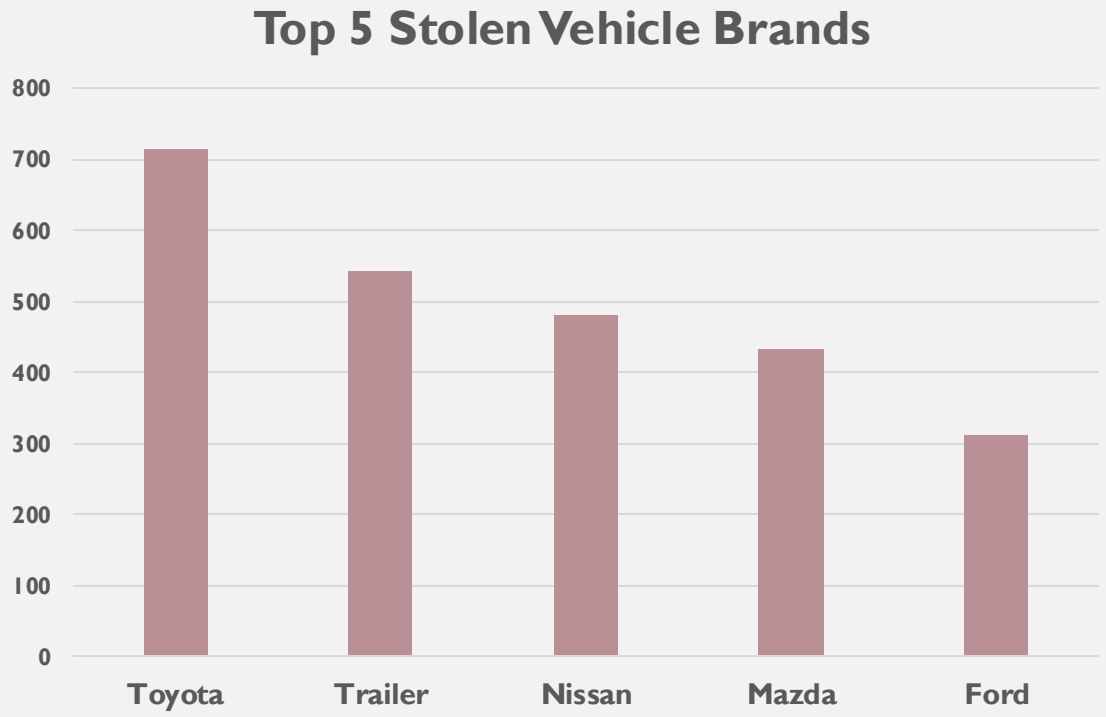


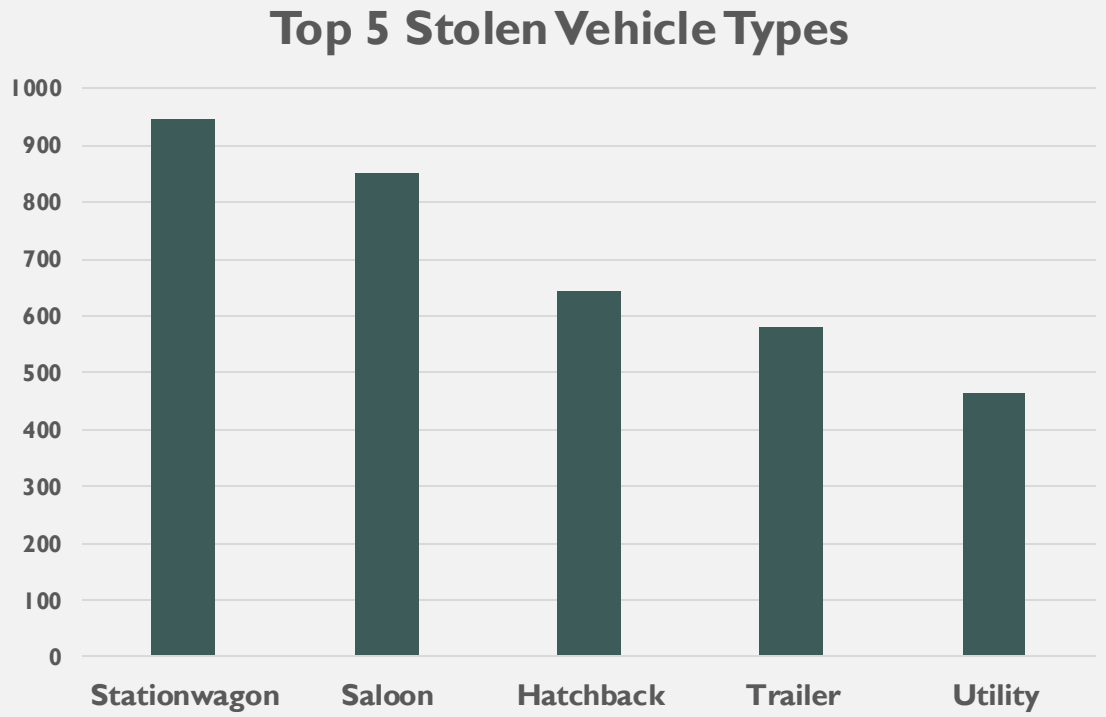
📈 Sharp rise until March 2022 → escalating theft activity

📉 Steep drop afterward → likely due to new measures or interventions

🔍 Monitor future months to confirm if the decline is sustained

VEHICLE →
WHICH BRANDS AND TYPES FACE THE HIGHEST THEFT RISK?





🚙 Toyota and station wagon vehicles → highest theft risk → prioritize in insurance and prevention.

🛠️ Use combined brand–type data for smarter risk control.

ENVIRONMENT →
HOW DOES POPULATION DENSITY AFFECT THEFT RATES?

Regions	Population Density	Theft Rate (per 100K people)	Total Population	Vehicle Theft Cases
Auckland	343.09	96	1,695,200	1,630
Nelson	129.15	169	54,500	92
Wellington	67.52	77	543,500	417
Bay of Plenty	28.8	128	347,700	445
Waikato	21.5	72	513,800	369
Taranaki	17.55	88	127,300	112
Northland	16.11	116	201,500	234
Canterbury	14.72	101	655,000	660
Hawke's Bay	12.92	55	182,700	100
Manawatū-Whanganui	11.62	54	258,200	139
Otago	7.89	57	246,000	139
Gisborne	6.21	336	52,100	175
Southland	3.28	25	102,400	26

Color scale:

- High
- Medium
- Low

- 🏙️ Cities = more thefts due to higher population & density.
- 🌲 Small regions ≠ safe (e.g., Gisborne) → high theft rates demand awareness beyond urban areas.
- 🎯 Balance urban prevention with rural education campaigns.