Monthly Unique Regional Population Estimates (MURPEs)

Methodology

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DATA VENTURES
Unique trusted data

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
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About the MURPEs

The MURPEs contain estimates of the number of unique local residents, domestic visitors, international visitors, and short-term international visitors who appeared in each regional tourism organisation (RTO) area each month starting from January 2019. Data Ventures and MBIE have worked together to produce this data series using anonymised data sourced from mobile phone telecommunications companies.

'Unique' here means each person will only be counted once in each area they appear, regardless of how many times they appear. For example, if somebody visits an area two separate times in the month, they will be counted once. In other words, the estimates relate to the number of visitors, and not the number of visits.

Segment Definitions

The definitions of international and domestic visitors are based on the World Tourism Organisation's definitions, which are found here: **Glossary of tourism terms | UNWTO**

In the monthly unique population estimates, population segments are defined as follows:

- International visitors are people from outside New Zealand who are staying in the country for less than one year,
- Short-term international visitors are a subset of international visitors who are staying in the country for less than 90 days. (These people are counted as both **'international'** and **'short-term international'**),
- Each New Zealander is assigned a primary home region, which is the RTO area where they most commonly appear (based on mobile phone pings). If somebody regularly commutes to another RTO area, this area is assigned as a secondary home region,
- Local residents are New Zealanders in their primary or secondary home region,
- Domestic visitors are New Zealanders outside their home region(s),
- RTO areas are defined using the 2020 boundaries, found here: **Regional Tourism Organisation Areas 2020 Clipped - GIS | | GIS Map Data Datafinder Geospatial Statistics | Stats NZ Geographic Data Service.** Those areas which are not currently operating as regional tourism organisations (Kawerau, Rangitikei, Tararua , Horowhenua, and Waimate) are not included in the dataset. However, the population in these areas is included in the national totals.

How do we Define Home Regions and Commuters?

The data that Data Ventures receives from our telecommunications data providers contains **anonymised information** about mobile phone locations. We use this information to understand the patterns in the places mobile phones appear and, by extension, the patterns in where people appear.

For each month of mobile phone data, we use a reference period of 90 days, calculated backwards from the end of the target month, to determine home areas. This reference period allows us to understand where someone has most commonly appeared over recent months.

Based on patterns in the mobile phone data, individuals are assigned a primary 'home area' – the RTO area where their mobile phone signal has appeared on the most days during the 90-day reference period.

Regular commuters are assigned a second 'home region' where they will be classed as local residents and not domestic visitors.

We have defined regular commuters as **people who appear in both their home region and another specific region on the same day, at least 25% of days.**

In other words, if a person is both in their main home area and another RTO area on average roughly **two days a week or more**, they are classed as a commuter. They will be counted as a local resident in both their main home area and the area they commute to.

The commuter definition was created with agreement with MBIE and a group of key stakeholders from the tourism sector. The commuter definition was chosen to account for people who regularly cross region boundaries for non-tourism reasons, such as:

- People with flexible working arrangements who work from home some days and in the office others,
- People who commute longer distances (e.g., by plane) and stay some nights in their home region and some nights in their work region,
- People who live close to borders between regions, and cross them frequently in their day-to-day lives.

We considered percentage cutoffs other than 25% – for example, percentages corresponding to roughly one day per week or three days per week. The definition needed to strike a balance between falsely capturing commuter activity as tourism, and missing true tourism activity.

Our exploratory work found that the choice of percentage had a negligible effect on trends in visitor numbers, and did not greatly affect visitor estimates overall.

The 25% cutoff was selected to accommodate flexible working schedules and long-distance commuters while recognising that some individuals may engage in tourism activity frequently (which could be missed by a lower cutoff).

The requirement to be in both areas on the same day was included to make sure that someone going on a longer holiday is not falsely classed as a commuter.

Commuter vs Domestic Visitor

Commuter	Domestic visitor
A person lives in the Waikato RTO area and works in the Auckland RTO area. They work from home three days a week and commute into the office two days a week.	A person lives in the Taupo RTO area. Once a month, they fly to Canterbury for a meeting at their company's headquarters.
A person lives in the Canterbury RTO area. Every Monday they fly to Wellington and every Tuesday they fly back to Canterbury.	A person lives in the Dunedin RTO area. They go to Auckland for four weeks to visit family.
A person lives right by the border between Northland and Auckland RTO areas. Several times a week they move across this border to shop or do other day-to-day tasks.	A person lives in the Waikato RTO area. Every Sunday during summer, they drive to a beach in the Coromandel RTO area, spend the day there, then drive back.

Technical Method

Input data

- Data Ventures receives device location estimates from Spark and Vodafone (the data providers).
- Spark provides aggregated and anonymised data containing the number of unique devices for each segment (local/domestic/short-term international/international) I in each RTO each month. Data Ventures supply Spark with the rules to define the segments.
- Vodafone supplies anonymised device locations at a cell-tower level. Data Ventures then uses the same rules to create segmented monthly unique device counts in the same form as the Spark data.

Defining location and segments

- For both input datasets, the rules to create the aggregated device counts are as follows:
  - Devices are assigned to an RTO area by estimating their location based on the signal strength to nearby cell towers.
  - Non-mobile phone devices (e.g., Internet of Things devices) are excluded from the device counts.
  - If the device has an international SIM card, it is classed as an international device.
    - International devices which first appeared more than 365 days ago are discarded.
    - International devices which first appeared less than 365 days ago are classed as international.
    - International devices which first appeared less than 90 days ago are classed as short-term international.
  - If a device with a New Zealand SIM card suddenly appears and then disappears again within 90 days, we consider the device likely to belong an international visitor who has purchased a New Zealand SIM card for their visit. These devices are also classed as international devices.
- A primary home region is assigned to each device with an NZ SIM card. The home region is based on the most common location over the previous 90 days.
- A secondary home region is assigned to devices which appeared in both their primary home region and another specific region on at least 25% of days.

Creating the output population counts

- Data Ventures produces the monthly unique device counts by summing up how many distinct devices have appeared in each segment in each RTO area during the month.
- We combine the monthly unique device counts from the two providers.
- We then convert the device counts to population counts by applying a weight (person-to-device ratio). The weighting process accounts for people without phones and people with several phones.
- We use supplementary datasets to inform the weights, including information about how many people are entering and leaving the country.
- To protect confidentiality, we randomly round population counts to base three.

What are the limitations of this data?

- These population figures are estimates and are best used to monitor trends rather than exact figures.
- Unique visitors are counted the same, regardless of their length of stay. So, people who only appear in an area outside their home region(s) for a brief period are still counted as domestic visitors. For example, if someone drives through the Waikato to get to their holiday destination of Auckland, they will appear as a domestic visitor in both RTO areas.
- International visitor numbers for the most recent three months are provisional and will be updated as we get more information about how long people are staying in the country.
- If Data Ventures experience any issues with the input data feed, numbers may be updated in future months as we receive better information or impute missing figures. This may happen if our data providers experience dropouts or conduct necessary maintenance.
- People who engage in tourism activities within their home region will not be counted as domestic visitors (for example, a person who lives in Hamilton and goes to the beach in Raglan). For some large and highly populated RTO areas, such as Auckland, this will have a large impact.
- The RTO numbers should not be summed up to get a total for a set of several RTOs. This is because one individual can be counted in multiple RTOs, and therefore will be counted multiple times.
- Information about the country of origin of international visitors or the area of origin for domestic visitors is not available.
- Data for months before January 2019 is not available as Data Ventures does

NOTE: A Privacy Impact Assessment has been completed to ensure the methodology complies with the Privacy Act 2020 and does not pose any risks to individuals.

For further information, please contact
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