



Tongariro Alpine Crossing

Economic Impact Assessment of
Proposed Visitor Restrictions

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m.e
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Executive Summary

The Tongariro Alpine Crossing (TAC) is facing increased challenges associated with growing visitor numbers. Concerns about overcrowding, environmental degradation, and infrastructure pressures have prompted an evaluation of the possibility to use visitor limits to manage these pressures. Balancing trade-offs between economic considerations, environmental sustainability, as well as other considerations like cultural elements and the visitor experience are crucial. We understand that the economic impacts will assist the Department of Conservation (DoC) to evaluate the wider trade-offs. DoC have proposed five different 'day visitor limits' to evaluate the different options. Market Economics (M.E) was approached to review DoC's modelling and to undertake a sensitivity analysis of the DoC settings. In addition, the potential economic impacts associated with the different visitor limits are estimated.

The five day-visitor limits and three rebooking settings (15 combinations) were considered. The economic impacts were assessed using a bespoke economic impact model that traces the flow of goods and services through the economy. The economic impacts are reported in terms of Value Added (VA) and employment. The key points of the sensitivity analysis are presented first, and then the results of the economic impact assessment are presented.


Sensitivity Analysis

A sensitivity analysis highlighting the spread of outcomes under differing input assumptions was completed. The sensitivity analysis is based on the DoC modelling. In the context of this analysis, the sensitivity analysis focuses on the potential spread of visitor activity and revenue changes under each visitor limit. That is, the number of visitors who will visit the TAC under each limit and the total revenue associated with that visitor level is considered. This includes concessions paid by visitors (indirectly), and the potential mix of spending. This information is useful because it provides insight into uncertainty. M.E used a Monte Carlo Simulation-type approach to assess the spread of outcomes. This was done by varying the core inputs simultaneously and iterating the model 1,000 times to create a range of outcomes across the scenarios. The main drivers were all varied, but visitor numbers and their spending form the main determinants.

The spread of outcomes for each visit level is wide, underlining uncertainty associated with the proposed changes. The spread of potential revenue is a function of visitor numbers, the limits and growth profile (post Covid recovery). The ranges of visitors, and the associated revenue spreads associated with the different limits are:

	Range of annual visitors	Range of Combined Revenue
2018/19 Activity Level	146,260	\$7.85m
600 limit	48,800-86,300	\$2.1m - \$4.6m
800 limit	61,700-110,400	\$2.7m - \$5.9m
1,000 limit	74,700-134,400	\$3.2m - \$7.1m
1,200 limit	87,700-158,500	\$3.8m - \$8.4m
1,500 limit	107,100-194,500	\$4.6m - \$10.3m

The spreads between the annual visitors within each visitor limit is wide. The scenarios with the higher limits (1,200 and 1,500) delivered annual visitor numbers that say the upper end of the estimates exceeding the 2018/19 seasons' visitors. The other visitor limits (600, 800 and 1,000) resulted in estimated visitor



numbers where the upper limits fell below the activities observed during 2018/19. Furthermore, the variation around the median is approximately 29%. With reference to the revenue range, the variation from the median observation is 35% lower, or 43% greater. This shows some upside bias. The revenue distribution highlights the interplays between the different cost (i.e., revenue) drivers which adds further variation to the outcomes. The sensitivity analysis considers variation in factors which would have an impact regardless of visitor limits being in place, such as weather and the distribution of concessionaire types.

The distribution highlights, that from a business-management perspective, there is likely to be considerable variation and spread between years in terms of visitor numbers, and revenue regardless of which approach (limit) set is used. The patterns highlight fact that the TAC and associated activity is exposed to the wider market, exhibiting the traits associated with tourism businesses – variable demand and open to from external forces.

Economic Impacts


The economic impacts assess the flow on effects of the TAC visitor limits by comparing the Value Added (VA, similar to GDP) and employment against a 'without the limits' scenario. The difference reflects the economic loss. For this assessment, the without scenario is based on the visitor numbers observed pre-Covid and with an assumed recovery pathway out to 2026/27 (as informed by information available at the time of undertaking this assessment).

Importantly, the economic assessment uses a perspective suggesting that the shifts are in the local, Raupehu and Taupo, economies. Part of the economic impacts relate to supply chain effects felt across NZ due to local shifts. In the case of the visitor limits, the direction of change is downwards, meaning that losses in the local economies flow through to the wider, national economy. However, caution is needed because it is likely that if a visitor cannot access/walk the TAC then they might partake in activity somewhere else in NZ, so that spending is not necessarily lost to NZ. Therefore, the economic flow-on effects are not necessarily lost to NZ, but is it is displaced from Ruapehu/Taupo. This means that the assessment has a local perspective. Additionally, potential responses like price changes, and how local businesses could respond to maximise revenue are beyond the scope of this report.

The analysis highlights that all visitor limits will have a negative economic impact (lost VA and employment), but the less restrictive options will have the smallest impacts. In fact, the analysis suggests that in some instances the least restrictive option will not have a negative impact (in the assessment period). Furthermore, the potential of dispersion of visitors to other parts of NZ may mitigate some of the effects at a national level. The results underscore the importance of carefully managing visitor numbers to ensure sustainable growth and the preservation of the natural and cultural resources of the Tongariro Alpine Crossing. However, the local effects remain felt in the immediate vicinity. The analysis does not reflect any price responses, and how local operators could change their pricing in response to the visitor limits. **Importantly, losing the visitor spending to the local areas does not mean that the economic impacts on NZ are negative. Spending could simply move to other regions so the New Zealand-wide economic impacts are likely to be neutral or marginal.**

The economic impact analysis covers the VA impacts of two aspects, firstly the lost revenue (concessions, activity fees and levies) as well as the visitor spending that is lost to the local economies.

The VA impacts associated with the lost revenue is estimated at between:

- 
- At the high end, based on the 600-limit: -\$1.9m in 2023, declining to -\$4.97m in 2026.
 - At the low end, based on the 1,500-limit: no impact over the short term, and -\$1.0m by 2026.

These figures show the range across the visitor limit approaches and consider the rebooking settings. The spread of outcomes associated with each visit-limit is influenced by the rebooking assumptions as provided by the Department of Conservation (DoC), which reflects how users could respond, i.e., reschedule the TAC activity or cancel the TAC altogether. The rebooking assumption is important and drives variation within the limit levels. For example, at the 2025/26 year, the difference between the VA impacts for the 600-limit varies between -\$3.9m and -\$4.96m, a spread of \$1m. Under the less restrictive limits (1,500 limit), the spread is between \$0 and -\$1.1m.

The economic impact of the proposed visitor limits extends beyond the impacts associated with losses in concessionaire revenue, crown revenue from the activity fees and the environmental management fees. This will encompass spending within the local economy by those tourists who are no longer visiting the TAC when visitor limits are in place. This spending not only covers related items such as guiding and hiking supplies but also wider tourist spending on hospitality, accommodation, retail, and other tourist activities.

The VA total impacts associated with the lost visitor spending in a year at peak demand is estimated at between:

- At the high end, based on the 600-limit: between -\$9.84m and -\$12.28m for VA.
- At the low end, based on the 1,500-limit: between no impact and -\$2.51m.

As these values are based on the average spending per visitor per day, this will encompass some of the impact from lost concessionaires, and as such, should be considered separately. Furthermore, while these impacts are particularly relevant to the local economy, the reaction by those tourists outside the visitor limit may be to spend more time and money on other activities or other regions of New Zealand, with visitor spending redistributed to other areas.

Concluding Remarks

The analysis of visitor limits under different rebooking settings reveals significant impacts on value added (VA) and employment. Considering the small nature of the Ruapehu economy, the local impacts will be considerable. In the Ruapehu context, the largest decline is broadly equal to a 0.4% decline in the local economy. This demonstrates the potential effects of the rebooking approach/limiting visitor numbers. These economic (VA) impacts need to be weighed against the wider objectives of limiting growth.

Overall, visitor limits reduce the scale of economic effects related to visitor spending, but it is important to note that VA should not be interpreted as a 'benefit' and does not capture non-market values. The assessment also highlights that the economic impacts form part of the overall impact of the visitor limits. Importantly, this assessment does not consider the wider economic and other costs and benefits, such as health and wellbeing effects, connecting with nature, social and cultural values, and environmental protection. These important aspects need to be integrated together with the economic effects and assessment.

Considering the post-Covid recovery, the findings underscore the importance of visitors and their spending in sustaining local economic activity and employment. Balancing visitor limits and economic impacts is crucial for managing the hiking track in a sustainable manner while maximizing economic benefits for the region, particularly for small local economies.



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1 Introduction

The Tongariro Alpine Crossing (TAC) is a successful hiking trail located in Tongariro National Park. The trail spans 19.4km and is renowned as one of the country's best day hikes. The hike is a significant economic asset to the local economy, stimulating the local visitor economy, attracting both domestic and international visitors, and contributing to the local and regional tourism industry.

The increasing popularity of the TAC has led to visitor management challenges. High visitor volumes increased challenges associated with:

- concerns about overcrowding of the track that impact negatively on visitor experience
- environmental effects, such as trail erosion, visitor impacts on flora and fauna
- upholding the cultural values of Ngati Hikairo ki Tongariro and Ngāti Tūwharetoa
- pressure on supporting infrastructure and services, and service level degradation, including:
 - transportation,
 - parking areas,
 - visitor centres,
 - accommodation, and
 - guided tour operators.


Addressing these challenges and pressures are crucial because it impacts on the overall visitor experience and satisfaction as well as safety.

Intuitively, the Crossing's economic benefits extend beyond the immediate trail area, supporting businesses in nearby towns and communities. Visitor spending on transportation, accommodation, food, guided tours, and related tourism activities generates revenue for the local economy. Despite the economic importance, the wider effects of the large increases in visitor numbers must be managed to preserve ecological and cultural values and integrity. Consequently, discussions have emerged regarding the potential implementation of visitor limits to address overcrowding and environmental sustainability issues.

The Department of Conservation (DoC) are considering the implementation of visitor limits to the Tongariro Alpine Crossing (TAC). With visitor numbers down from pre-COVID peaks, there is an opportunity to implement visitor limits before tourism activity returns to its previous levels. As part of considering different options, DoC prepared a 2022 report, "Tongariro Alpine Crossing: Economic Impact Assessment of the proposed visitor restrictions". This report canvassed the potential effects of restricting day-visitor numbers on the TAC. DoC has commissioned M.E to review the report. After the initial review and high-level feedback, DoC revised the work and refined the analysis, and included a wider range of potential effects. Subsequently, M.E has been approached to undertake supplementary analysis of the potential alternatives.

1.1 Objectives

ME have been tasked with building on the latest modelling by DoC. The project consisted of two parts, expressed as objectives.

- 
- To review the updated modelling work by specifically completing a sensitivity analysis of the visitor and revenue assessment, and the associated assumptions, and
 - To illustrate the potential economic impacts associated with limiting visitor numbers on the TAC. This part focuses on the economic value of the lost business opportunities, expressed in GDP and employment terms.

Spatially, the modelling focuses on the local areas, near the TAC. There is some uncertainty around how visitors could respond to the new regulations, but the different options used by DoC provides a sufficient range to provide an understanding of the likely spread of outcomes. The DoC work is reviewed and assessed using a Monte Carlo Simulation type approach with different settings evaluated using an iterative process where the key variables were adjusted and the model re-run. A total of 1,000 iterations were completed for each setting.

1.2 Base Values and DoC Modelling

Over the years, the popularity of the TAC with tourists has grown significantly with over 150,000 visitors pre-Covid. During peak times, daily visitors can exceed 2,500 visitors/day generating adverse effects, lowering the quality of visitor experience, generating negative environmental, cultural, and social effects. We understand that, through partnership with local iwi, DoC are considering daily visitor limits in order to protect the TAC.

Generally, most visitors access the trail at the Mangatepopo carpark and finish at Ketetahi. As the crossing is a linear journey (not a return-to-start), most visitors use shuttles to and/or from the crossing. A small (around 10%) proportion of visitors use alternative means. It is anticipated that shuttle bus capacities (via concessionaires) could be a way to manage visitor limits.

Visitor limits are likely to influence the local economy through different channels, firstly, the change in visitor movements through TAC shuttle and tour operators, with sectors of the local economy such as the wider tourism industry, accommodation and hospitality being affected through shifting use patterns. Beyond this, the potential flow-on effects of the proposed limits may also be felt by the wider local economy through supply chain effects (these are outlined later in the report, in Figure 3-1).

DoC modelling reflects several different limits:

- 600 visitors per day limit,
- 800 visitors per day limit,
- 1000 visitors per day limit,
- 1200 visitors per day limit and
- 1500 visitors per day limit.

Using the DoC modelling structure, M.E adjusted the relationship between different parts enabling additional analysis and sensitivity analysis. Further detail is provided in Appendix 1 that offers a high level summary of DoC's modelling.



1.3 Approach

As pointed out in the objectives, this assessment has two parts. The approach followed to deliver the two parts is summarised below.

Sensitivity analysis: The modelling work completed by DoC forms the foundation for this part. Essentially, the DoC model was used as a starting point, and after identifying the key drivers and parameters, the potential spread of input values was considered. Next, the model was adjusted in a way that enabled each key driver (input settings) to be adjusted (+/- a percentage range). The model was set-up to iterative 1,000 times, with the key drivers then varying within the set range. The results are extracted for each model run and the distribution of results are interpreted. This spread of potential outcomes illustrates the uncertainty, and the sensitivity of key assumptions are accordingly identified. Where necessary the limitations of DoC's modelling are acknowledged where they lead to general limitations in our analysis. Crucially, the sensitivity analysis is based on DoC modelling.

The second part of the project reports the economic impacts in GDP and employment terms. Using the anticipated change associated with the different limits, the change in economic activity was estimated. The shifts in economic transactions were mapped to the 109 economic sectors, and spatially. The base structure for the modelling work consists of five regions:

- Ruapehu District,
- Taupo District,
- rest of Manawatu-Whanganui region,
- Rest of Waikato region, and
- rest of New Zealand.

The model provides a comparative static description of the Value Added and employment. The modelling reports the different stages associated with the supply chain links. Value added (synonymous with GDP) arises through the spending, directly through the immediate spending, then as businesses buy inputs associated with the buy goods and services, that again, flow through the economy. These different stages are referred to as:

- The direct impacts,
- The indirect impacts, and
- The induced impacts.

A more detailed description of these impacts is presented in the Appendix. The model contains data on economic activity each sector in each of the five regions. The model used to test the flow on impacts, across the economies, of different visitor limits. Visitor demand is calculated per month using daily demand and restricted to the relevant limits and seasonality aspects.



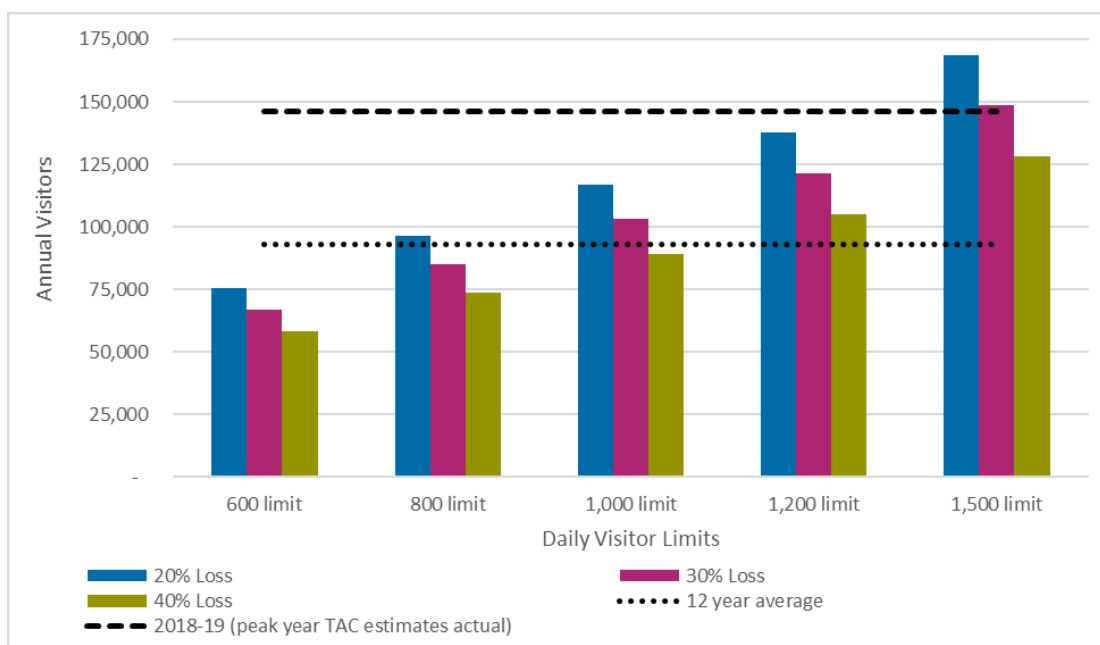
1.4 Key Assumptions

The effects of the visitor limits arise from the change in visitor spending due to fewer visitors travelling to complete the TAC. The specific number of visitors affected by the change is based on the difference between the assumed visitor number (excluding the limits), and the capped visitor numbers. The visitor numbers of exceedances are based on a review of historical patterns. However, there are opportunities for visitors to shift their TAC walk to alternative days, thereby the effects of limits would be less than the difference mentioned above.

The assumption used in the earlier modelling is that 20%, 30%, or 40% percent loss when shifting to the weekdays under the limit¹. Visitor numbers on weekdays are then lowered to reflect the proportion of visitors who previously would visit the crossing on a peak day and do not move to a day where there is room under the limit. While this creates a picture of the dispersion of visitors. However, shifting the demand could in fact lead to overcapacity in the subsequent (alternative) days.

Historic trends suggest that annual visitor numbers were in the order of 150,000 per annum in the pre-Covid year, and the 12-year average was marginally below 100,000 per annum. The daily limits (of visitor numbers) are translated into annual visitors, and the 'lost' visitors are estimated based on the share (20%-40% mentioned) of affected visitors. Figure 1-1 reports the number of visitors for each limit and percentage for each visitor cap and each level of rebooking percentage loss to weekdays. The figure shows the historic annual visitors.

Figure 1-1: Projected Visitor Numbers (Limits)



¹ The assumptions of the loss percentages were provided within DoC's modelling.



The figure shows that the 800 daily visitor limit matches the long-term historical average most closely at 20 percent loss for weekdays. This level illustrates one potential outcome and is aligned with historic levels. However, this does not reflect growth patterns and the tourism numbers in the pre-Covid situation. The figure shows that under the higher limits, a portion of visitors would be impacted, and still exceed the high points experienced before Covid.

An important assumption is that if weekday visitors are impacted by the limit, then they will reschedule their TAC walk. While this provides an element of smoothing, it does not reflect the effects of weather (even though the effects of adverse weather events are included in the scenario modelling). It is important to note that the scenario modelling does not consider a recovery timeline.

Drawing on the visitor numbers, revenue projections are prepared from each scenario. The revenues cover:

- The Crown revenue activity fee is estimated based on rate of \$4.08 per person,
- The local environmental management fee is estimated based on a rate of \$1.60 per person,
- Concessionaire revenue is estimated at rates of \$55 per person for a two-way or \$45 for a one-way trip.

It is assumed that concessionaires will adjust their prices once the environmental management fee and transport fee increases come into effect. It is assumed that concessionaires will increase prices from \$50 to \$55 for two-way concessions and from \$40 to \$45 for a one-way trip. All revenues are collected through concessionaires, and 90% of users use concessionaire services. The balance (10%) uses private transport. Most users (89%) use two-way travel arrangements. This could change if a booking system, is in place.

The following figures (Figure 1-2 through to Figure 1-4) reflect the projections from DoC’s modelling for the three items mentioned above). The figures include the revenue levels based on the peak 2018-19 year with no restrictions as benchmarks.

Figure 1-2: Crown Revenue from Activity Fee

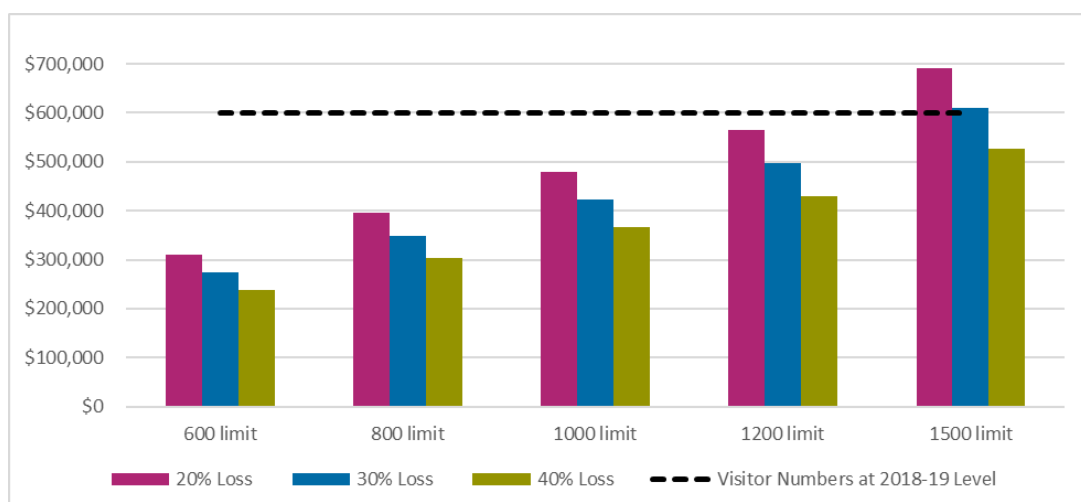




Figure 1-3: Local Environmental Management Fee

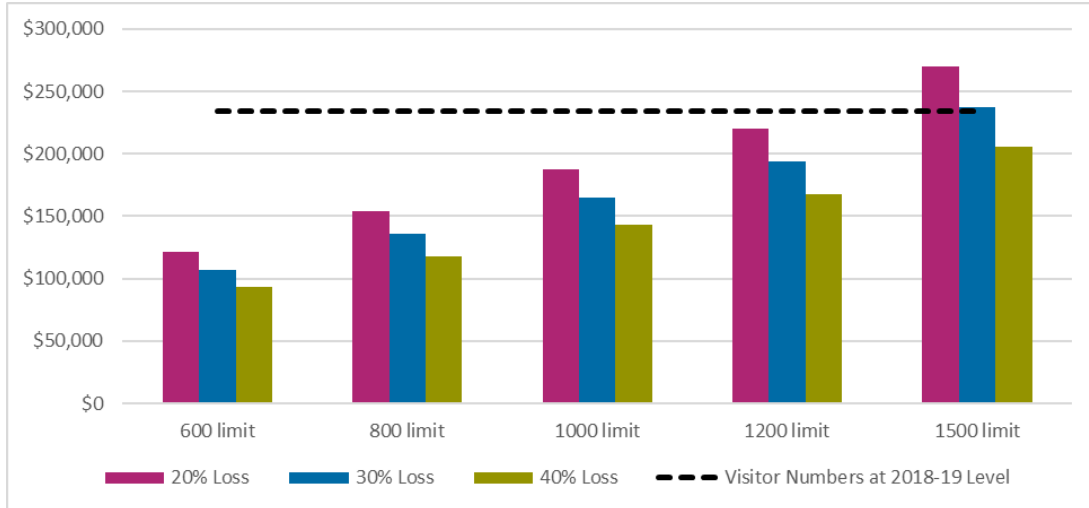
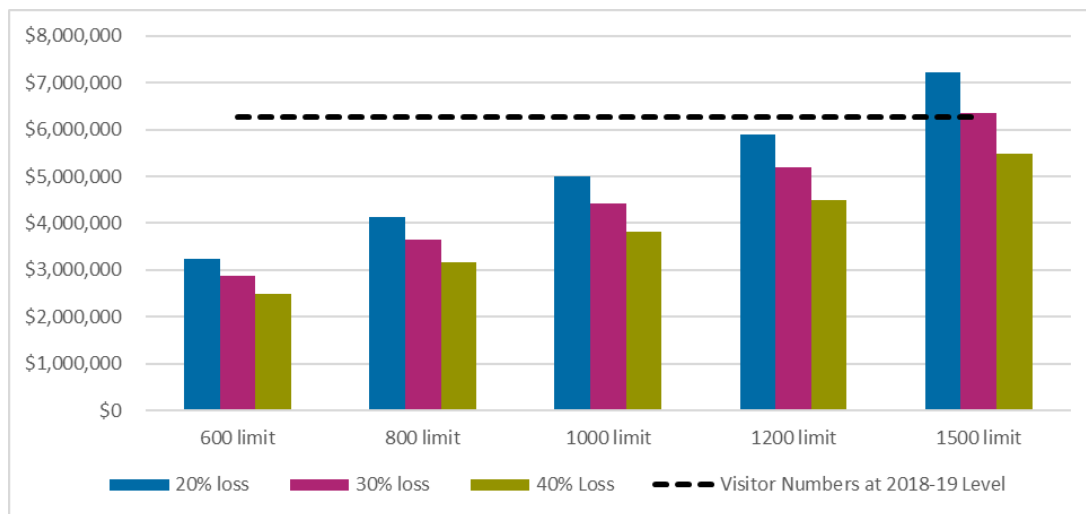


Figure 1-4: Concessionaire Revenue after Activity Fee and Local Environmental Management Fee



1.5 Report Structure

The report is structured as follows:

- Section 2 covers the sensitivity analysis of the visitor and revenue assessment, and the associated assumptions, and
- Section 3 presents the results of the assessment of the potential economic impacts associated with limiting visitor numbers on the TAC.



2 Sensitivity Analysis

The DoC analysis uses several assumptions and inputs. Understanding the change in results (size of movements) due to adjustment in the inputs assumptions is important as it generates insight around the robustness. It is also important to then appreciate the spread/range of results and treat the spread as a way to understand uncertainty. In modelling, a sensitivity analysis can also be used to identify key thresholds e.g., by how much should capital costs need to increase to deliver a cost-benefit ratio that is less than one. However, this current assessment does not have such requirements. Nevertheless, it is now structured in a way that enables such goal-seeking analysis to be completed.

This section describes the key variables that are adjusted as part of the sensitivity analysis, and then the results are presented.

2.1 Approach

The sensitivity analysis is built into the DoC model. M.E reconstructed the model, identified the dependent variables, and adjusted the associated parameters. These are mostly related to visitor numbers and the different spending levels associated with visitors. A Monte Carlo Simulation-type approach is used to vary the input values in a random manner, thereby offering an ability to illustrate the outcomes across many combinations of the inputs. The following key inputs were identified, and are adjusted in the sensitivity analysis:

- The percentage of visitors lost to a weekday shift, with the DoC identified parameters varied between 10% and 50% (the base values were 20%, 30% and 40%),
- The number of available, clear weather and marginal weather days per month, and reflects seasonal use patterns and weather variability. The base values in DoC's model were varied by +/- 10%,
- The proportions of tourists using concessionaires with a variable range between 80% and 100%,
- The proportion of concessionaires on 1-way or 2-way concessions. For 1-way concessions this was between 0% and 20% and, consequently the two-way concessions varied between 80% and 100%.

In contrast to varying some inputs, a selection of assumptions was held constant to focus the sensitivity analysis on the relevant parts, including:

- The distribution of visitors from the peak weekend days to weekdays,
- The visitor demand assumptions (i.e., at a total level),
- Visitor charges of Activity Fee charge of \$4.10 and local environment management fee of \$1.60, and
- Concessionaire charges were held at \$45 for 1-way and \$55 for 2-way concessions.

The visitor limits identified and modelled by DoC formed the foundation for the analysis and we assessed the implications of those limits. The sensitivities around each limit were tested. This was done by running the model 1,000 times with the randomisation of inputs. The results for each model run are then saved and the distribution of results is then analysed. The outputs provide an indication of the distribution of outcomes, with the spread of outcomes illustrating the anticipated uncertainties and outliers.



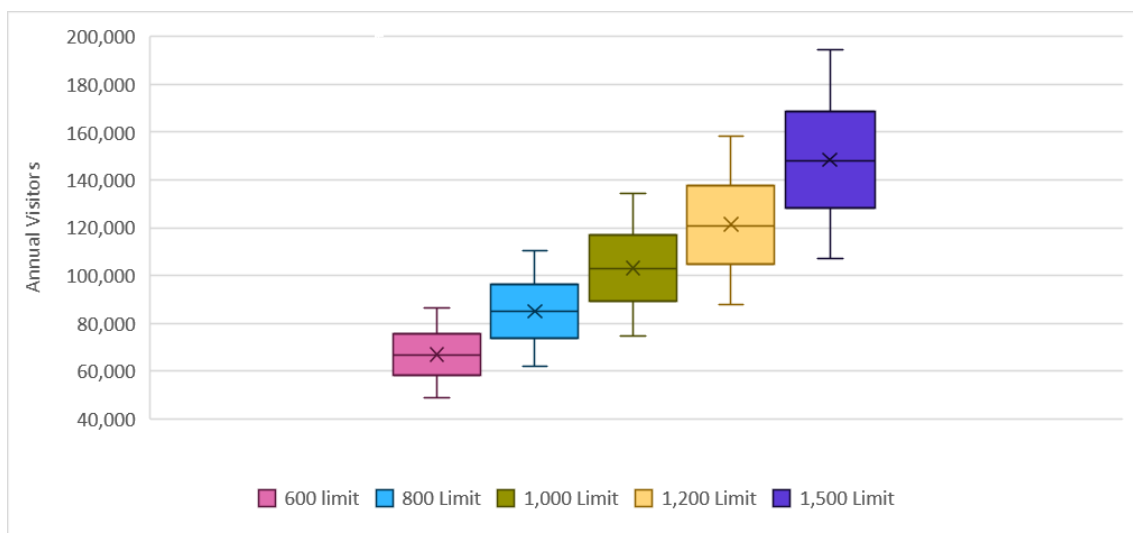
2.2 Outcomes

As indicated above, the outcomes are based on the iterative model runs, showing the anticipated spread of outcomes. The annual visitor numbers and spending levels show the results under the multiple runs. This reflects variability around average number of adverse weather days, the mix of trips (one-way vs return trips), as well as rebooking levels (assumptions). The two parts, visitor numbers and revenue levels, are discussed separately.

2.2.1 Annual Visitor Numbers

The potential variations and outcomes in annual visitor counts drive the total effects, but this is capped by the visitor limits. That is, the total amount of visitor spending going to TAC activity operators and the wider economy is driven by the total number of visitors and their spending levels. The simulation considered the impact associated with the different variations and these are presented for each visit limit. Figure 2-1 shows the distribution of outcomes, reporting the annual visitor estimates.

Figure 2-1: Distribution of Outcomes – Annual Visitor Numbers



The range is based on the spread of potential users associated with the different settings.

- 600 daily limit distribution suggests that the annual visitors completing/undertaking the TAC are:
 - Range 48,780 and 86,325,
 - Average 66,900,
 - Median 66,700.
- 800 daily limit distribution suggests that the annual visitors completing/undertaking the TAC are:
 - Range 61,750 and 110,370,
 - Average 85,030,
 - Median 84,800.
- 1,000 daily limit distribution suggests that the annual visitors completing/undertaking the TAC are:
 - Range 74,720 and 134,410,
 - Average 103,170,



- Median 102,900.
- 1,200 daily limit distribution suggests that the annual visitors completing/undertaking the TAC are:
 - Range 87,690 and 158,455,
 - Average 121,300,
 - Median 120,900.
- 1,500 daily limit distribution suggests that the annual visitors completing/undertaking the TAC are:
 - Range 107,140 to 194,525,
 - Average 148,510,
 - Median 147,900.

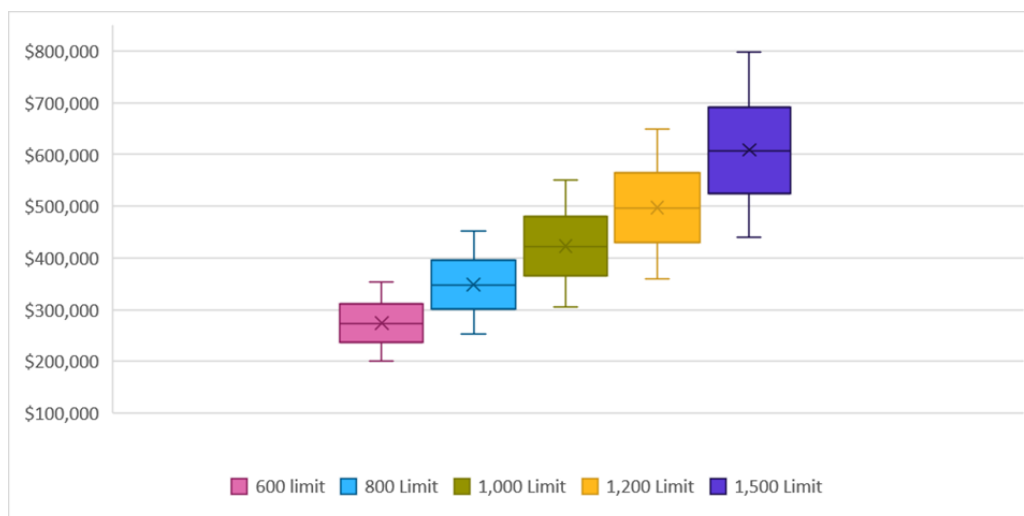
The distribution of visitor estimates across the scenarios is as expected with variation across the settings. This variation is driven by the number of clear weather days, and difference in visitor levels between the low and high settings where, for example, the difference is more than 900 visitors/day. The analysis highlights the fact that the TAC as an outdoor activity and subject to weather conditions. However, in the peak summer months, weather conditions are generally expected to be good, so the impacts of the limits are more acute during these periods.

2.2.2 Revenue Sources

The potential variation in revenue levels were reviewed and the potential distribution of revenue for each visitor level was analysed. The income levels are influenced by the visitor levels as well as the share of visitors using one- or two-way concessionaires. Estimating the spread in potential revenue levels involved both fixed charges as well as the mix of visitors (e.g., activity fees, and concessionaire charges). The mix of one- vs two-way travel also drives total variation.

Figure 2-2 shows the distribution of outcomes for revenue generated from the activity fee.

Figure 2-2: Distribution of Outcomes – Crown Revenue from Activity Fee





The results from the distributions of outcomes under each visitor limit showed:

- For the 600 daily limit:
 - Range \$200,000 and \$354,000,
 - Average \$274,000,
 - Median \$273,600
- For the 800 daily limit:
 - Range \$253,000 and \$453,000,
 - Average \$349,000,
 - Median \$347,500.
- For the 1,000 daily limit:
 - Range \$306,000 and \$551,000,
 - Average \$423,000,
 - Median \$422,100
- For the 1,200 daily limit:
 - Range \$360,000 and \$650,000,
 - Average \$497,000
 - Median \$495,800
- For the 1,500 daily limit:
 - Range \$439,000 to \$798,000,
 - Average \$609,000
 - Median \$606,500.

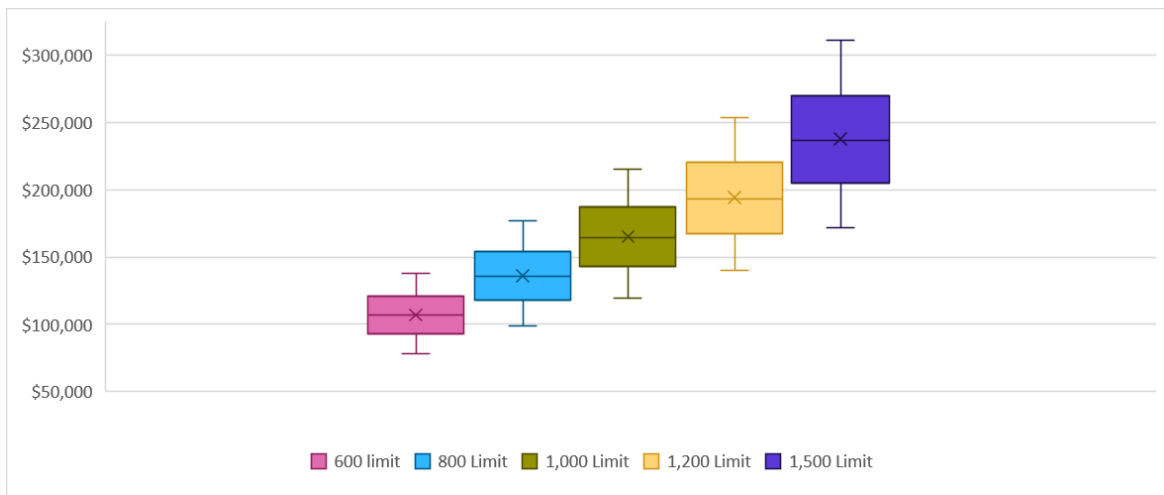
The distribution of outcomes for the local environment management fee is shown in (see Figure 2-3), and are:

- For the 600 daily limit:
 - Range \$78,000 and \$138,000,
 - Average \$107,000
 - Median \$106,800
- For the 800 daily limit:
 - Range \$99,000 and \$177,000,
 - Average \$136,000,
 - Median \$135,600.
- For the 1,000 daily limit:
 - Range \$120,000 and \$215,000,
 - Average \$165,100,
 - Median \$164,700.
- For the 1,200 daily limit:
 - Range \$140,000 and \$253,000.
 - Average \$194,100,
 - Median \$193,500.
 -
- For the 1,500 daily limit:
 - Range \$171,428 to \$311,238,



- Average \$238,000,
- Median \$236,700.
-

Figure 2-3: Distribution of Outcomes – Local Environmental Management Fees

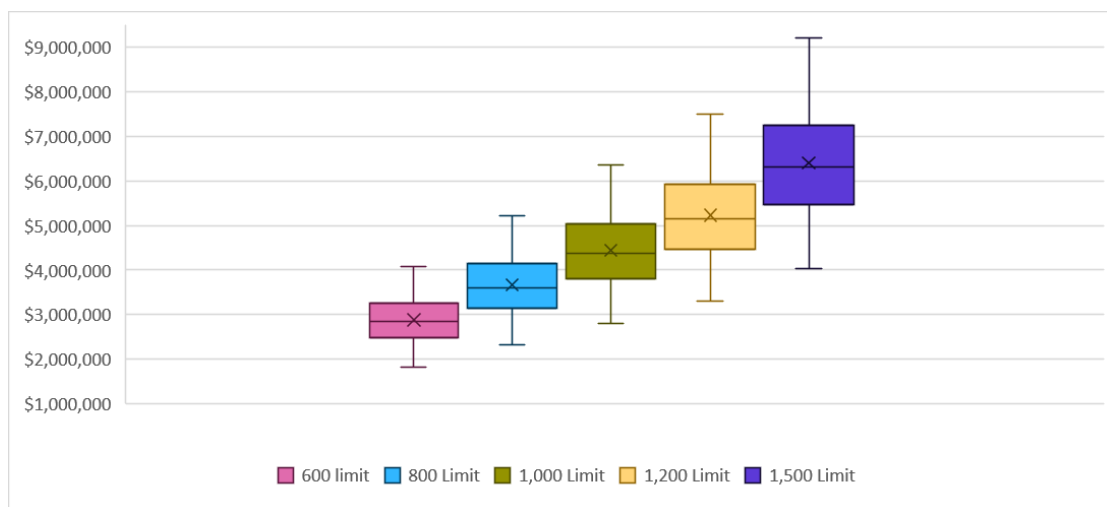


The distribution of total concessionaire revenue after activity and local environmental management fee is shown in Figure 2-4. For total revenue collected by the concessionaires after the activity and local environmental management fees (i.e., the net amount which is received by the concessionaires), the outcomes for each limit ranged between:

- For the 600 daily limit:
 - Range \$1.83m to \$4.09m,
 - Average \$2.88m,
 - Median \$2.84m.
- For the 800 daily limit:
 - Range \$2.32m and \$5.22m,
 - Average \$3.67m
 - Median \$3.61m.
- For the 1,000 daily limit:
 - Range \$2.80m to \$6.36m,
 - Average \$4.45m,
 - Median \$4.38m.
- For the 1,200 daily limit:
 - Range \$3.29m and \$7.50m,
 - Average \$5.23m,
 - Median \$5.15m.
- For the 1,500 daily limit:
 - Range \$4.03m \$9.21m,
 - Average \$6.40m,
 - Median \$6.30m.



Figure 2-4: Distribution of Outcomes – Concessionaire Revenue



These findings from the sensitivity modelling emphasize the importance of considering various variables when determining visitor limits, as they impact the projected revenue from the different sources. By analysing different scenarios and their associated revenue outcomes, decisions regarding visitor limits are informed by the expected ranges within which revenues sources while ensuring a sustainable visitor experience. As such, these results illustrate the potential spread of outcomes around the projections of DoC’s projection model. Overall, the distribution of the projected outcomes is relatively evenly distributed for each measure under each visitor limit. This is primarily a reflection of the variation in rebooking loss which was randomly allocated between 10% and 50%. Furthermore, the range of variation is extended by the number of clear weather days, causing a greater spread at the higher limits.

The distribution of outcomes from the activity and environmental management fees are almost identical. This because both charges are tied to the number of visitors using concessionaires with the only difference being the rate of each charge. However, the distribution of concessionaire revenue outcomes shows significant variation across all the visitor limits. This reflects the higher level of uncertainty which is a result of the greater amount of determining factors, such as the addition of variation to the proportions of concessionaire types.

The distribution also highlights, that from a business-management perspective, there is likely to be considerable variation and spread between years in terms of visitor numbers, and revenue. The patterns highlight fact that the TAC and associated activity is exposed to the wider market, exhibiting the traits associated with tourism businesses – variable demand and unprotected from external forces.

2.3 Summary

The sensitivity analysis highlights the spread of potential outcomes under the different visitor limits. Table 2.1 shows the range of visitors for each limit-level as well as the associated revenue spreads associated with the different limits. The spread of outcomes for each visit level is wide, underlining uncertainty associated with the TAC. Crucially, the spread is unrelated to the limits, but influenced by unrelated factors (e.g., the weather).



Table 2.1: Range of Outcomes for Visitors and Combined Revenue Sources

	Range of annual visitors	Range of Combined Revenue
600 limit	48,800-86,300	\$2.1m - \$4.6m
800 limit	61,700-110,400	\$2.7m - \$5.9m
1,000 limit	74,700-134,400	\$3.2m - \$7.1m
1,200 limit	87,700-158,500	\$3.8m - \$8.4m
1,500 limit	107,100-194,500	\$4.6m - \$10.3m

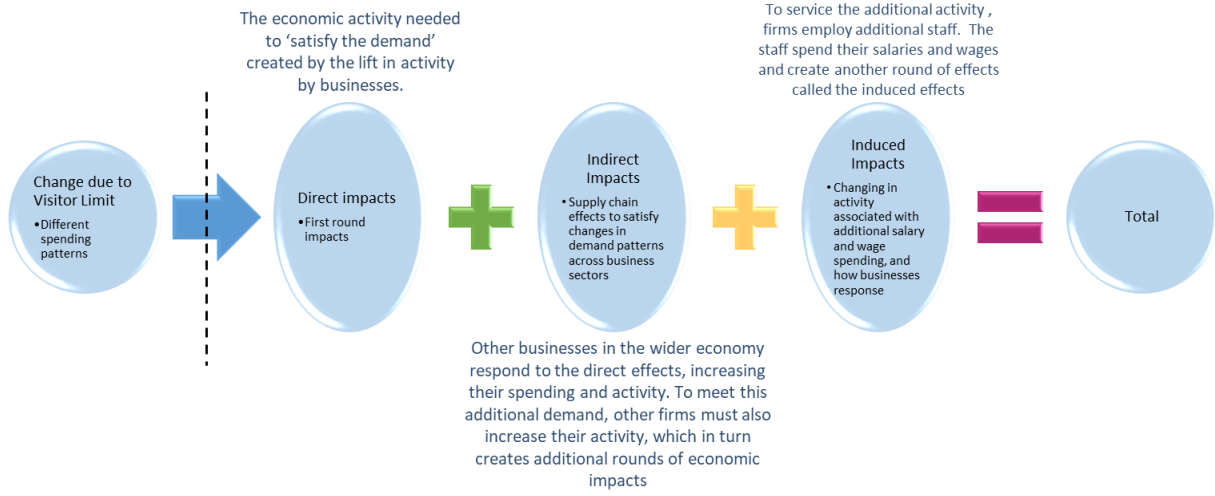
3 Economic Impacts

Imposing limits on the number of users that could access the Crossing will change the visitor spending flowing to the local economy. These changes will have flow on implications, impacting local businesses and households. It is however important to note that the shift expected to impact on the local economy and transferred to other parts of NZ. **That is, the potential effects could be transferred to other parts of NZ meaning that the economic impacts to NZ are neutral. The assessment of impacts highlights the economic impacts that will be felt in the local economies².**

The assessment uses the DoC estimates as a starting point and applies the visitor estimates, changes in the activity fees, environmental management fees, and concessionaire revenue to estimate the flow on effects. The difference between visitor spending associated with the visitor limits and the historic levels is interpreted as the net effect. The five different visitor limits as well as a total closure scenario were assessed.

The shifts and local change in economic transactions were modelled using a bespoke Multi-Regional Input-Output (MRIO) model that has been customised for the local economy. The key parts of the model are outlined in section 1.3. Using the MRIO, the Value Added and employment effects associated with the change in economic activity are estimated. Value added (synonymous with GDP) arises through the spending, directly through the business processes, purchasing inputs and paying salaries and wages. These transactions flow through the economy, generating second and third (and other) rounds of impacts. Figure 3-1 shows the different parts. These elements are important and form the basis of how the results are presents (especially the direct and total results). The modelling reports the sum of these impacts. Spatially, the model integrates the different local economies, highlighting the flowing within them, as well as the linkages to other regions. The analysis covers several years to show the potential effects of a recovery in visitor numbers in the post-Covid environment.

Figure 3-1: Types of impacts



² It is acknowledged that the proposed visitor limits will lead to some shift in the visitation patterns of tourists. As such, not all activity is necessarily lost to the New Zealand economy as there is likely to be some spill over into other regions.



The analysis compares the Value Added and employment, sustained for each daily visitor limit scenario at peak demand. This is done using the revenue projects for concessionaire revenue, crown revenue from activity fees, and the local environmental management fee. Given that visitor numbers are recovering, even if they are not yet at levels seen before COVID-19, the economic impacts of the visitor limits are assessed over first four years after implementation. This utilises projections for visitor numbers over the next three years with a full return to pre-COVID-19 tourist activity in 2026. Appendix 1 offers additional detail about IO modelling.

The effects are reported in terms of the change spending associated with the TAC directly, as well as the lost visitor spending flowing to the rest of the local economy. The two parts are dealt with separately.

It is important to note that the assessment reflects the economic impacts associated with lower local spending and visitor activity. The spatial focus is on the local economies, and part of the analysis illustrates how lower local spending will flow through to the rest of NZ. The spending patterns shift (due to the visitors changing their behaviour) can be expected transfer to other parts of NZ. This means that the impacts reported for the rest of NZ should be treated with caution. Visitors could change their patterns and spend their visitor-Dollars elsewhere in NZ. Therefore, the NZ-impacts are likely to be transferred around NZ, and not entirely lost to the country. The key take-away is that the impacts of the visitor limits will be felt acutely in the local economy.

3.1 Base values

To assess the impact of the visitor limits a baseline is set against which to compare the change. The pre-Covid levels were used as the benchmark. It is acknowledged that this is a high level, but it is considered appropriate because the management initiatives are aimed at reducing/mitigating against the effects associated with over-tourism. The sensitivity highlights the potential implications of using a lower benchmark. The visitor numbers associated with the different capacity limits were used to estimate the annual equivalent change in Dollar values for the main components:

- Activity fees³,
- Environmental management fees, and
- concessionaire revenue.

It is this change in potential transaction (values) that form the economic shock, and the modelling then estimates the size of the economic response. The response is reported in VA and employment terms.

The VA impact of the TAC at the peak year⁴ is shown in Table 3.1. The direct VA represents the economic contribution across the different regions. The values are for a single year.

In the Ruapehu District, the direct VA amounts to \$2.62 million, with activity fees and environmental fees contributing \$0.10 million and \$0.09 million respectively. The concessionaire revenue's flow on effects contributes \$2.43 million. Similarly, the Taupo District shows a direct value added of \$1.04m with activity

³ The assessment of the crown revenue sourced from activity fee only considers the estimated portion from international visitors.

⁴ The peak year is based on the visitor numbers of the 2018/19 season.

fees contributing \$0.05m, environmental management fees contributing \$0.04m and concessionaire revenue contributing \$0.96m. The rest of the Manawatu-Whanganui, Waikato, and New Zealand regions report small amounts of direct VA, indicating the concentration of the direct economic impact of the TAC. The total direct value added for all regions is estimated at \$3.68m.

Table 3.1: Value Added Impact of TAC at Peak Demand with No Visitor Limits

Region	Activity Fee	Environmental Management Fee	Concessionaire Revenue	Total
Direct Value Added				
Ruapehu District	\$ 102,000	\$ 90,000	\$ 2,430,000	\$ 2,622,000
Taupo District	\$ 47,000	\$ 35,000	\$ 955,000	\$ 1,037,000
Rest of Manawatu-Whanganui	\$ 3,000	\$ -	\$ -	\$ 3,000
Rest of Waikato	\$ 3,000	\$ -	\$ -	\$ 3,000
Rest of New Zealand	\$ 15,000	\$ -	\$ -	\$ 15,000
Total Direct Value Added	\$ 170,000	\$ 125,000	\$ 3,384,000	\$ 3,680,000
Total Value Added				
Ruapehu District	\$ 137,000	\$ 110,000	\$ 2,834,000	\$ 3,081,000
Taupo District	\$ 86,000	\$ 66,000	\$ 1,642,000	\$ 1,794,000
Rest of Manawatu-Whanganui	\$ 11,000	\$ 5,000	\$ 100,000	\$ 115,000
Rest of Waikato	\$ 18,000	\$ 12,000	\$ 205,000	\$ 234,000
Rest of New Zealand	\$ 103,000	\$ 88,000	\$ 2,821,000	\$ 3,012,000
Total Value Added	\$ 354,000	\$ 280,000	\$ 7,602,000	\$ 8,236,000

Furthermore, the total VA represents the broader economic impact, encompassing indirect and induced effects. In other words, the total VA The Ruapehu District shows a total VA of \$3.08m, made up as follows:

- activity fees contributing \$0.14m,
- environmental management fees contributing \$0.11m, and
- concessionaire revenue contributing \$2.83m.

The Taupo District captures total VA of \$1.79, with activity fees contributing \$0.09m, environmental management fees contributing \$0.07m, and concessionaire revenue contributing \$1.64m. The total VA in the other regions is comparatively small and relate the supply chain effects of local (Ruapehu and Taupo) businesses' procuring inputs from the wider economy. Nevertheless, these values show the integrated nature of the visitor sector, and the TAC's wide reach. The total VA for all regions is estimated at \$8.24m

Table 3.2 shows the employment impacts associated with each of the revenue sources of the TAC from one year of visitor activity (based on the peak level of visitors).

The employment that the Crossing sustains due to the different revenue streams is broken down in the table. At a total (summed across the revenue streams), the TAC sustains around 41 MECs⁵ from the direct impact, with 71 MECs sustained through its total impact (including the flow-on effects). Most of the supported employment relates to concessionaire revenue with the direct employment focused in the local Ruapehu and Taupo districts. The total employment supported through the supply chains, across the

⁵ An MEC is a modified employee count, an employment measure that includes a headcount of all employees as well as an adjustment for working proprietors.



different locations is more distributed across the different locations. Again, this highlights the economic reach of the TAC.

Table 3.2: Employment Impact of TAC at Peak Year with No Visitor Limits

Region	Activity Fee	Environmental Management Fee	Concessionaire Revenue	Total
Direct Employment (MECs)				
Ruapehu District	1	4	23	29
Taupo District	1	1	11	12
Rest of Manawatu-Whanganui	0	0	0	0
Rest of Waikato	0	0	0	0
Rest of New Zealand	0	0	0	0
Total Direct Employment	2	5	34	41
Total Employment (MECs)				
Ruapehu District	2	4	25	30
Taupo District	1	1	15	17
Rest of Manawatu-Whanganui	0	0	1	1
Rest of Waikato	0	0	2	2
Rest of New Zealand	1	1	20	21
Total Employment	4	6	62	71

The base situation reflects the substantial VA and employment impacts associated with the TAC's operations. Most of the economic effects are felt locally, with linkages to the wider economies. Actions that reduce the visitor numbers will change the overall spending levels, and translate into economic impacts⁶. The size of such impacts can be estimated by comparing the economic values against base estimated above.

There is however some uncertainty around the specific recovery pathway for the visitor economy in the post-Covid environment. The generally suppressed economic activity and low confidence levels in the global economy also add uncertainty around the outlook. For this assessment, a gradual recovery to 2026 is assumed. Figure 3-2 shows the estimated annual VA impacts of the TAC. The figure shows the direct impacts (spatially broken down), and the wider flow on impacts (not spatially disaggregated) over time.

The underlying spatial patterns align with those outlined above. The figure shows the potential change in scale as the visitor economy recovers. These effects are across all areas (spatially) and for the different impacts (direct, vs total). The key observation is that the potential VA is expected to recover from around \$5.10 million to around \$8.24 million over time. This profile reflects the temporal considerations associated with the recovery and must be overlaid with the effects of the capacity constraints to understand the potential 'future' losses associated with those limits. Appendix 4 reports the supported employment levels using the same structure as above.

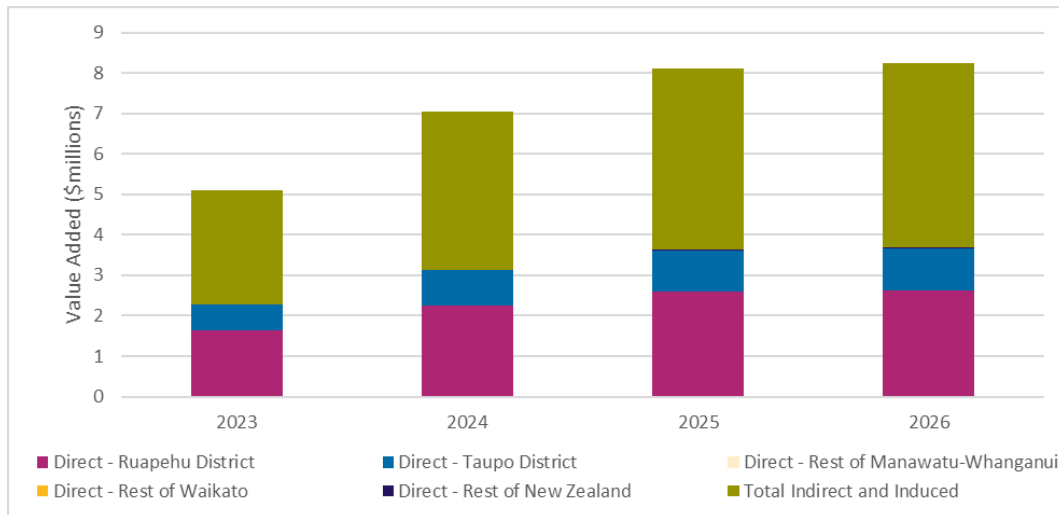
The base values show the 'without limits' economic impacts using several assumptions about the recovery profile. Importantly, the TAC has sizeable impacts at the local level, but it also has wider flow-on impacts across the region. These impacts are expected to increase and grow towards historic levels as the visitor

⁶ This is assuming that prices are held constant as price level responses are not considered in the analysis.



economy recovers. However, there is some uncertainty around the specific recovery pathway. Regardless, the base values form a foundation for illustrating the size of the economic impacts of different visitor limits.

Figure 3-2: Value Added Impacts of TAC with No Visitor Limits 2023-26



3.2 Economic effects per visit limits

The economic impacts of the daily visit limits are presented below. The discussions are for each limit level. The VA and employment effects are highlighted. In this section, the annual values are shown (for one year). The temporal effects are discussed separately, at the end of this section. The daily limits are linked to three re-booking settings. This shows the relative loss of TAC users that would rebook, shifting their itineraries in response to the limits.

Note: the patterns observed across the different settings are similar, and only the scale changes. The main points are:

- Most of the VA impacts are felt locally, in Ruapehu and Taupo
- The employment effects show a similar distribution and are also felt locally,
- The TAC and the associated economic effects do have a wide spatial reach, with impacts felt beyond the local areas.

An important caveat that applies is that the assessment does not consider price changes e.g., how local business could respond to the visitor limits. For example, some could reduce prices to stimulate demand and attract new business (from other markets), or they can increase prices to maintain overall profit levels.

3.2.1 600 Daily Visitor Limit

While the activity under the visitor limit does still sustain economic activity, the potential visitor numbers are constrained and the 600 visitors per day limit has the largest economic impacts (vs the other limit levels). The VA impacts of this limit is illustrated in Table 3.3.

Across the rebooking loss assumptions, the direct VA impact of the 600 daily limit is a reduction of between \$1.78m and \$2.22m. The two main regions directly affected by the limit are the Ruapehu and Taupo districts. The total VA impact of the 600 daily limit is a loss of between \$3.98m and \$4.96m across the economy. With the indirect and induced impacts also considered, a large portion of the impacts are felt in the rest of NZ.

Table 3.3: Value Added Loss from 600 Daily Visitor Limit at Peak Demand

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Value Added			
Ruapehu District	-\$ 1,265,000	-\$ 1,422,000	-\$ 1,579,000
Taupo District	-\$ 500,000	-\$ 562,000	-\$ 624,000
Rest of Manawatu-Whanganui	-\$ 2,000	-\$ 2,000	-\$ 2,000
Rest of Waikato	-\$ 2,000	-\$ 2,000	-\$ 2,000
Rest of New Zealand	-\$ 7,000	-\$ 8,000	-\$ 9,000
Total Direct Value Added	-\$ 1,776,000	-\$ 1,996,000	-\$ 2,216,000
Total Value Added			
Ruapehu District	-\$ 1,487,000	-\$ 1,671,000	-\$ 1,855,000
Taupo District	-\$ 866,000	-\$ 973,000	-\$ 1,080,000
Rest of Manawatu-Whanganui	-\$ 56,000	-\$ 62,000	-\$ 69,000
Rest of Waikato	-\$ 113,000	-\$ 127,000	-\$ 141,000
Rest of New Zealand	-\$ 1,454,000	-\$ 1,634,000	-\$ 1,814,000
Total Value Added	-\$ 3,975,000	-\$ 4,467,000	-\$ 4,960,000

Table 3.4 illustrates the employment impacts resulting from rebooking losses for the 600 visitor limit. Direct employment experiences negative effects, with reductions of between -20 and -25 across the rebooking settings. These impacts are concentrated in the local areas of Ruapehu and Taupo in terms of direct impacts. The Ruapehu District is projected to experience notable declines in direct employment, ranging from -13.8 to -17.2. Similarly, the Taupo District incurs employment losses ranging between -5.8 to -7.2.

Table 3.4: Employment Loss from 600 Daily Limit at Peak

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Employment (MECs)			
Ruapehu District	-13.8	-15.5	-17.2
Taupo District	-5.8	-6.5	-7.2
Rest of Manawatu-Whanganui	0.0	0.0	0.0
Rest of Waikato	0.0	0.0	0.0
Rest of New Zealand	-0.1	-0.1	-0.1
Total Direct Employment	-20	-22	-25
Total Employment (MECs)			
Ruapehu District	-14.5	-16.2	-18.0
Taupo District	-8.1	-9.1	-10.1
Rest of Manawatu-Whanganui	-0.5	-0.5	-0.6
Rest of Waikato	-1.0	-1.1	-1.3
Rest of New Zealand	-10.3	-11.6	-12.9
Total Employment	-34	-39	-43



In terms of total employment (across the economy) and the local employment base will see the largest effects. The Ruapehu District will see employment losses between from -14.5 to -18.0 MECs, while the Taupo District will experience declines ranging from -8.1 to -10.1. Additionally, the rest of the regions, including Manawatu-Wanganui, Waikato, and the rest of New Zealand, also experience negative employment impacts driven by indirect and induced effects. Across all regions, the total employment impact ranges from -34 to -43.

These observed patterns repeat for the other visitor limits but are not as severe because the scale of change is less.

3.2.2 800 Daily Visitor Limit

Table 3.5 summarises the VA losses resulting from rebooking scenarios using the 800 daily visitor limit. The direct VA demonstrates negative impacts across all regions, with losses ranging from:

- 20 rebooking loss \$1.26m,
- 30% rebooking loss \$1.54m, and
- 40% rebooking loss \$1.82m.

Spatially, Ruapehu District and Taupo District experience significant direct impacts:

- Ruapehu District VA loss of between \$0.90m and \$1.30m, and
- Taupo District VA loss of between \$0.35m to \$0.51m.

In terms of total VA, Ruapehu District and Taupo District will bear most of the impacts, ranging between \$1.05m and \$1.307m in Ruapehu and between \$0.61m and \$0.89m in Taupo. The rest of the regions, including Manawatu-Wanganui, Waikato, and the rest of New Zealand, also face negative impacts. However, on total value added, with losses ranging from \$0.04m to \$1.49m. The total VA impact across all regions ranges from \$2.81m to \$4.08m.

Table 3.5: Value Added Loss from 800 Visitor Limit

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Value Added			
Ruapehu District	-\$ 895,000	-\$ 1,097,000	-\$ 1,300,000
Taupo District	-\$ 354,000	-\$ 434,000	-\$ 514,000
Rest of Manawatu-Wanganui	-\$ 1,000	-\$ 1,000	-\$ 2,000
Rest of Waikato	-\$ 1,000	-\$ 1,000	-\$ 2,000
Rest of New Zealand	-\$ 5,000	-\$ 6,000	-\$ 7,000
Total Direct Value Added	-\$ 1,256,000	-\$ 1,540,000	-\$ 1,824,000
Total Value Added			
Ruapehu District	-\$ 1,051,000	-\$ 1,289,000	-\$ 1,527,000
Taupo District	-\$ 612,000	-\$ 751,000	-\$ 889,000
Rest of Manawatu-Wanganui	-\$ 39,000	-\$ 48,000	-\$ 57,000
Rest of Waikato	-\$ 80,000	-\$ 98,000	-\$ 116,000
Rest of New Zealand	-\$ 1,028,000	-\$ 1,260,000	-\$ 1,493,000
Total Value Added	-\$ 2,810,000	-\$ 3,446,000	-\$ 4,082,000

Table 3.6 provides a breakdown of the employment impacts for the 800-visitor limit. Direct employment shows negative effects, with reductions of -14, -17, and -20, depending on the rebooking loss settings. Among the regions, the Ruapehu District and Taupo District will experience the large portion significant direct impacts. The Ruapehu District has notable declines in direct employment, ranging from -9.8 to -14.2. Similarly, Taupo will see employment losses ranging between -4.1 and -6.0. The wider economy will also see some losses based on the flow-on effects, through supply chain effects.

Table 3.6: Employment Loss from 800 Daily Limit at Peak

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Employment (MECs)			
Ruapehu District	-9.8	-12.0	-14.2
Taupo District	-4.1	-5.0	-6.0
Rest of Manawatu-Whanganui	0.0	0.0	0.0
Rest of Waikato	0.0	0.0	0.0
Rest of New Zealand	0.0	-0.1	-0.1
Total Employment (MECs)	-14	-17	-20
Total Employment (MECs)			
Ruapehu District	-10.2	-12.5	-14.8
Taupo District	-5.7	-7.0	-8.3
Rest of Manawatu-Whanganui	-0.3	-0.4	-0.5
Rest of Waikato	-0.7	-0.9	-1.0
Rest of New Zealand	-7.3	-9.0	-10.6
Total Employment (MECs)	-24	-30	-35

At a total employment level, the which includes both indirect and induced effects (all flow on impacts), Ruapehu and Taupo will see most of the employment impacts. The Ruapehu District will experience employment drops between -10.2 and -14.2, while the Taupo District faces declines ranging from -5.7 to -8.3. The employment effects across the wider regions are relatively minor, but the rest of NZ will see some employment losses (-7.3 to 10.6). Across all regions, the total employment impact ranges from -24 to -35.

3.2.3 1,000 Daily Visitor Limit

The 1,000 visitor limit is the central limit across the different settings. Table 3.7 showcases the direct and total impacts under different rebooking settings.

Table 3.7: Value Added Loss from 1,000 Daily Visitor Limit at Peak Demand

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Value Added			
Ruapehu District	-\$ 524,000	-\$ 772,000	-\$ 1,020,000
Taupo District	-\$ 207,000	-\$ 305,000	-\$ 403,000
Rest of Manawatu-Whanganui	-\$ 1,000	-\$ 1,000	-\$ 1,000
Rest of Waikato	-\$ 1,000	-\$ 1,000	-\$ 1,000
Rest of New Zealand	-\$ 3,000	-\$ 4,000	-\$ 6,000
Total Direct Value Added	-\$ 735,000	-\$ 1,084,000	-\$ 1,432,000
Total Value Added			
Ruapehu District	-\$ 615,000	-\$ 907,000	-\$ 1,199,000
Taupo District	-\$ 358,000	-\$ 528,000	-\$ 698,000
Rest of Manawatu-Whanganui	-\$ 23,000	-\$ 34,000	-\$ 45,000
Rest of Waikato	-\$ 47,000	-\$ 69,000	-\$ 91,000
Rest of New Zealand	-\$ 602,000	-\$ 887,000	-\$ 1,172,000
Total Value Added	-\$ 1,645,000	-\$ 2,425,000	-\$ 3,205,000



The direct VA is expected to contract, shedding between \$0.74m and \$1.43 depending on the rebooking settings. Most of the direct impacts are expected in Ruapehu and District with VA losses between \$0.52m and \$1.02m, and \$0.2m and \$0.4m respectively.

As with the other limits, the total VA impacts are also concentrated locally, with supply chain effects seeing some impacts in the rest of NZ. At a total level (including the flow-on effects), Ruapehu District shows substantial VA losses ranging from \$0.62m to \$1.20m, while Taupo District incurs losses between \$0.36m and \$0.70m. The rest of the regions, including Manawatu-Whanganui, Waikato, and the rest of New Zealand, also face negative impacts on total VA which are largely through the indirect and induced effects. The total VA impact across all regions reaches ranges from \$1.65m to \$3.21m.

Table 3.8 outlines the employment impacts.

Table 3.8: Employment Loss from 1,000 Daily Limit at Peak

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Employment (MECs)			
Ruapehu District	-5.7	-8.4	-11.1
Taupo District	-2.4	-3.5	-4.7
Rest of Manawatu-Whanganui	0.0	0.0	0.0
Rest of Waikato	0.0	0.0	0.0
Rest of New Zealand	0.0	0.0	-0.1
Total Direct Employment	-8	-12	-16
Total Employment (MECs)			
Ruapehu District	-6.0	-8.8	-11.7
Taupo District	-3.4	-4.9	-6.5
Rest of Manawatu-Whanganui	-0.2	-0.3	-0.4
Rest of Waikato	-0.4	-0.6	-0.8
Rest of New Zealand	-4.3	-6.3	-8.3
Total Employment	-14	-21	-28

Direct employment reflects negative effects, with reductions of -8, -12, and -16, reflecting the rebooking settings. Notably, Ruapehu District and Taupo District bear direct employment impacts. The Ruapehu District will see direct employment down by between -6 and -12. Similarly, the Taupo District incurs employment losses ranging from -2 to -5.

In terms of overall employment (that is both the indirect and induced effects), the Ruapehu District and Taupo District will see notable impacts. The Ruapehu District exhibits employment reductions ranging from -6.0 to -11.7, while Taupo District faces declines ranging from -3 to -7. The wider NZ will also see employment effects associated with shifts in supply chain patterns. Across all regions, the total employment impact ranges from -14 to -28.

3.2.4 1,200 Daily Visitor Limit

The 1,200-visitor limit is the second highest limit and

Table 3.9 summarises the economic impacts associated with this limit. Based on rebooking settings, the direct VA losses range between \$0.22m to \$1.04m for different rebooking loss percentages. Ruapehu District and Taupo District emerge as the regions experiencing the most substantial direct impacts. Ruapehu District encounters notable downward shift in VA, ranging from \$0.15m to \$0.74m, while Taupo’s potential loss is estimated at between \$0.06m and \$0.29m.

Expanding the impacts to include flow-on effects suggests that the total VA impacts are:

- Ruapehu District \$0.18m to \$0.87m,
- Taupo District \$0.11m to \$0.51m, and
- Rest of NZ \$0.18m to \$0.85m

The overall impact on total VA across NZ is estimated to range between \$0.28m to \$2.33m.

Table 3.9: Value Added Loss from 1,200 Daily Visitor Limit at Peak Demand

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Value Added			
Ruapehu District	-\$ 153,000	-\$ 447,000	-\$ 741,000
Taupo District	-\$ 60,000	-\$ 177,000	-\$ 293,000
Rest of Manawatu-Whanganui	\$ -	-\$ 1,000	-\$ 1,000
Rest of Waikato	\$ -	-\$ 1,000	-\$ 1,000
Rest of New Zealand	-\$ 1,000	-\$ 3,000	-\$ 4,000
Total Direct Value Added	-\$ 215,000	-\$ 627,000	-\$ 1,040,000
Total Value Added			
Ruapehu District	-\$ 180,000	-\$ 525,000	-\$ 871,000
Taupo District	-\$ 105,000	-\$ 306,000	-\$ 507,000
Rest of Manawatu-Whanganui	-\$ 7,000	-\$ 20,000	-\$ 33,000
Rest of Waikato	-\$ 14,000	-\$ 40,000	-\$ 66,000
Rest of New Zealand	-\$ 176,000	-\$ 513,000	-\$ 851,000
Total Value Added	-\$ 480,000	-\$ 1,404,000	-\$ 2,328,000

Table 3.10 presents the employment impacts.

Table 3.10: Employment Loss from 1,200 Daily Limit at Peak

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Employment (MECs)			
Ruapehu District	-1.7	-4.9	-8.1
Taupo District	-0.7	-2.1	-3.4
Rest of Manawatu-Whanganui	0.0	0.0	0.0
Rest of Waikato	0.0	0.0	0.0
Rest of New Zealand	0.0	0.0	0.0
Total Direct Employment	-2	-7	-12
Total Employment (MECs)			
Ruapehu District	-1.7	-5.1	-8.5
Taupo District	-1.0	-2.9	-4.7
Rest of Manawatu-Whanganui	-0.1	-0.2	-0.3
Rest of Waikato	-0.1	-0.4	-0.6
Rest of New Zealand	-1.2	-3.7	-6.1
Total Employment	-4	-12	-20



Focusing on direct employment, like the other limits, the employment effects are generally downwards. However, the scale is less than with the other limit levels. Direct employment losses are estimated at between -2 and -12 under different rebooking loss percentages and across NZ. Most of these losses are concentrated locally, in Ruapehu (-2 to -8) and Taupo (-1 to -3).

At a total level (including supply chain effects), both Ruapehu District and Taupo District continue to bear large shares of the employment effects:

- Ruapehu District between -1.7 to -8.5, and
- Taupo District between -1.0 to -4.7.

The rest of NZ will see employment losses of between 1 and 6. Overall (aggregate) employment losses are expected to sit between -4 to -20.

3.2.5 1,500 Daily Visitor Limit

The final limit assessed is the 1,500-limit. This option has the lowest economic impact because it places the smallest constraint on visitor numbers. Table 3.11 presents the VA impact for the different rebooking settings. The direct VA shows mixed results, with most instances being neutral i.e., no negative effect. Only the highest rebooking settings return negative impacts. At these points, the direct VA impacts are in Ruapehu (-\$0.32m) and Taupo (\$-0.13m).

In terms of the total impacts (including the flow-on effects), again only the 40% rebooking setting sees negative impacts. These are in Ruapehu, Taupo and the Rest of NZ. Most (59%) of the impacts are felt locally.

Table 3.11: Value Added Impact from 1,500 Daily Visitor Limit at Peak Demand

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Value Added			
Ruapehu District	\$ -	\$ -	-\$ 322,000
Taupo District	\$ -	\$ -	-\$ 127,000
Rest of Manawatu-Whanganui	\$ -	\$ -	\$ -
Rest of Waikato	\$ -	\$ -	\$ -
Rest of New Zealand	\$ -	\$ -	-\$ 2,000
Total Direct Value Added	\$ -	\$ -	-\$ 452,000
Total Value Added			
Ruapehu District	\$ -	\$ -	-\$ 379,000
Taupo District	\$ -	\$ -	-\$ 220,000
Rest of Manawatu-Whanganui	\$ -	\$ -	-\$ 14,000
Rest of Waikato	\$ -	\$ -	-\$ 29,000
Rest of New Zealand	\$ -	\$ -	-\$ 370,000
Total Value Added	\$ -	\$ -	-\$ 1,012,000

The total VA ranges is estimated at around \$1.01m, and felt:

- Ruapehu District -\$0.38m
- Taupo District -\$0.22m

- Rest of NZ - \$0.37m.

The employment impacts associated with the 1,500-limit are shown in Table 3.12. The direct employment impacts are associated with the 40% rebooking setting. Spatially, Ruapehu District (-3.5) and Taupo District (-1.5) see the direct employment losses.

Turning to total employment (including the employment supported by all the supply chain effects) both the Ruapehu District and Taupo District will see some effects. The Ruapehu District is projected to see a drop of 3.7 MEC and Taupo will see a loss of 2.1 MEC. At a total level, the employment impacts will see a drop of 9 MECs.

Table 3.12: Employment Impact from 1,500 Daily Limit at Peak

Region	20% Rebooking Loss	30% Rebooking Loss	40% Rebooking Loss
Direct Employment (MECs)			
Ruapehu District	0.0	0.0	-3.5
Taupo District	0.0	0.0	-1.5
Rest of Manawatu-Whanganui	0.0	0.0	0.0
Rest of Waikato	0.0	0.0	0.0
Rest of New Zealand	0.0	0.0	0.0
Total Direct Employment	0	0	-5
Total Employment (MECs)			
Ruapehu District	0.0	0.0	-3.7
Taupo District	0.0	0.0	-2.1
Rest of Manawatu-Whanganui	0.0	0.0	-0.1
Rest of Waikato	0.0	0.0	-0.3
Rest of New Zealand	0.0	0.0	-2.6
Total Employment	0	0	-9

3.2.6 Complete Closure

Once of the potential options to consider as part of the management approach is the closure of the TAC. In effect, this approach would see a complete loss of the activity associated with the TAC and the flow on effects. In the context of this assessment, such a close would be equal to losing the economic effects associated with the current situation (plus the assumed growth outlook over time). The base values are described earlier (section 3.1) and the data tables apply. Closing the TAC would mean that the VA and employment effects describe earlier would be lost. The key metrics are:

- The VA effects:
 - In Ruapehu District, the direct VA would decline by -\$1.63m in 2023 to -\$2.62m in 2026.
 - Taupo District will also see a negative effect, with VA declining by -\$0.64m to -\$1.04m over the same period.
 - The direct VA effects across the economy will drop by -\$2.28m in 2023, increasing to -\$3.68m in 2026.
 - The total VA (including the flow-on impact) will fall to Ruapehu and Taupo, as well as the wider national economy. The VA impacts are:
 - In Ruapehu District at between -\$1.91m in 2023 to -\$3.08m in 2026.



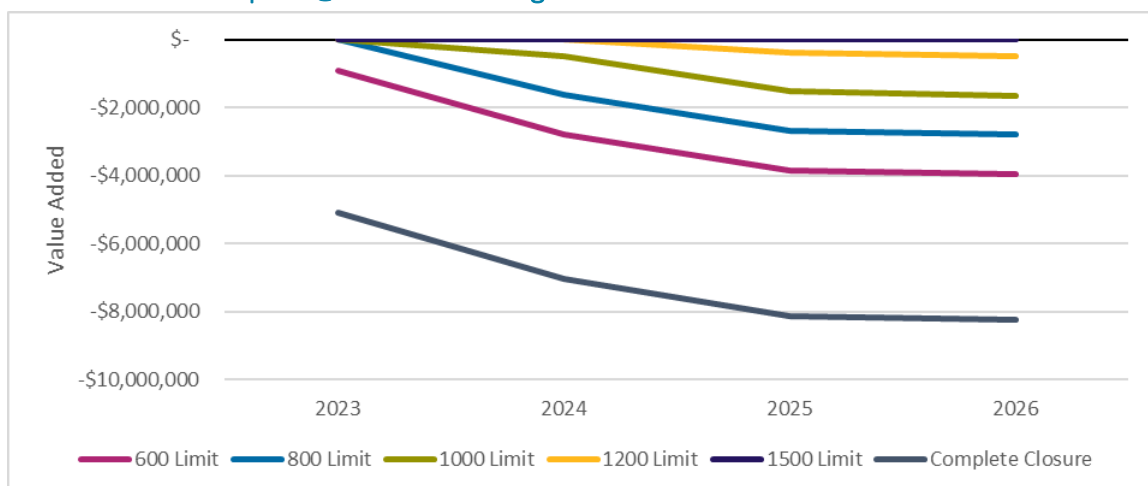
- Taupo District ranging from -\$1.11m to -\$1.79m.
- In terms of employment:
 - The direct job losses will be felt in the local area, with a drop of 18 MEC in Ruapehu (2023), decreasing further to 29 by 2026 (to reflect the potential losses associated with the recovery). In Taupo, the job losses are estimated at between -7 (2023), expanding further to -12 by 2026.
 - Once the wider, flow-on implications are considered, the local areas still account for most of the employment losses, but the rest of NZ will also see some shifts. The total employment losses are:
 - Ruapehu -18 to -30 by 2026,
 - Taupo -10 to -17 by 2026, and
 - Rest of NZ -13 to -21 in 2026.

3.2.7 Temporal effects

An important consideration of the economic effects is the shifts over time. The potential effects are compared against the pre-Covid levels as well as an assumed recovery from the current levels to the high levels observed. The recovery timeframe assumes that recovery will be 'complete' by 2026. The growth/recovery profile is applied to the different visitor limits as well as the rebooking settings. The results across the different combinations are reported. In addition, the complete closure scenario is also reported.

Figure 3-3 depicts the VA impact for the different visitor limits, and the 20% rebooking loss setting.

Figure 3-3: Total VA Impact @ 20% Rebooking



The VA impacts are the greatest for the visitor limits with the largest constraining effects, i.e., the lowest visitor limits. The total VA loss for the 600-limit starts at -\$1.00m in 2023 and the loss grows to -\$4.4 in 2026. Similarly, the Total VA loss for the 800, 1000, and 1200 limits also exhibit a declining trend, and the general profile of the 800-limit is the same as that observed for the 600-limit. However, the other visitor limits have a slightly different profile. This is due to the interplays between the recovery pathway, the limit



levels, and the rebooking settings. The other limits' (1,200) VA impacts are relatively minor and take some time to manifest. The 1,500-limit does not see a VA impact over the timeframe because the rebooking settings limit the net loss.

As expected, complete closure yields the highest VA impact, starting at $-\$5.58\text{m}$ in 2023 to and decreasing further to $-\$9.02\text{m}$ in 2026.

The profile mirrors that observed for the 20% rebooking setting, but the scale of loss is greater. Total VA lost for the two most restrictive limits are:

- 600-limit starts at $-\$1.40\text{m}$ in 2023 and drops to $-\$4.47\text{m}$ in 2026.
- 800-limit starts at $-\$0.40\text{m}$ in 2023 and drops to $-\$3.45\text{m}$ in 2026.

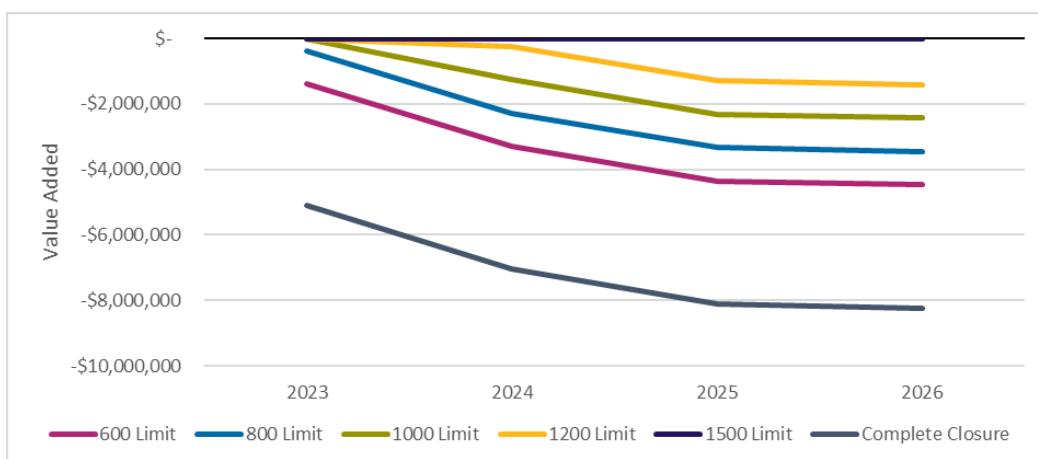
The less restrictive limits have a marginally different pattern, with the VA impacts taking longer to manifest, and the VA impacts are lower. The 1,000 and 1,200-limit are less restrictive but start to generate comparatively small VA impacts, as they are implemented. However, the scale of VA impacts is less than the other limits, and the lowest visit-limits do not generate negative impacts over the short term. These impacts emerge in the second and third years, as a portion of the potential recovery spending is foregone. The results for the 1,500-level suggest that at this level (and with the rebooking settings), the overall level of activity is expected to be near the levels seen pre-Covid.

Figure 3-4 illustrates the findings for the 30% rebooking setting. The profile mirrors that observed for the 20% rebooking setting, but the scale of loss is greater. Total VA lost for the two most restrictive limits are:

- 600-limit starts at $-\$1.40\text{m}$ in 2023 and drops to $-\$4.47\text{m}$ in 2026.
- 800-limit starts at $-\$0.40\text{m}$ in 2023 and drops to $-\$3.45\text{m}$ in 2026.

The less restrictive limits have a marginally different pattern, with the VA impacts taking longer to manifest, and the VA impacts are lower. The 1,000 and 1,200-limit are less restrictive but start to generate comparatively small VA impacts, as they are implemented. However, the scale of VA impacts is less than the other limits, and the lowest visit-limits do not generate negative impacts over the short term. These impacts emerge in the second and third years, as a portion of the potential recovery spending is foregone. The results for the 1,500-level suggest that at this level (and with the rebooking settings), the overall level of activity is expected to be near the levels seen pre-Covid.

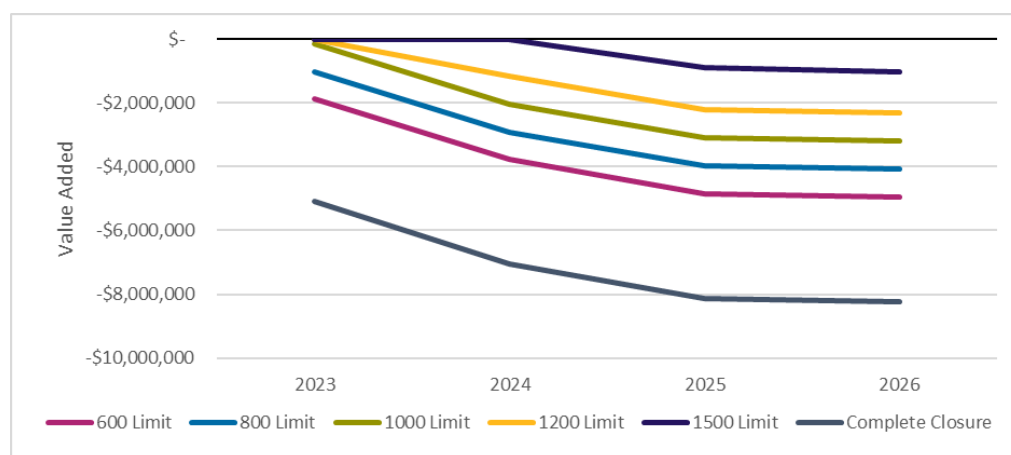
Figure 3-4: Total VA Impact @ 30% Rebooking





The third rebooking setting used in the analysis is the 40% rebooking loss. Figure 3-5 portrays the modelled VA impacts for the different limits. The total VA loss for the 600-limit starts at $-\$1.89\text{m}$ in 2023, and the loss grows to $-\$4.96\text{m}$ in 2026. Total VA for the 800, 1,000, and 1,200 limits also follows a decreasing trend, but with lower starting points. The 1,200-limit has does not have a VA loss in the starting period (2023) but a negative effect emerges over the short term (2024) as the limits start to impact TAC users. This loss is estimated at $-\$0.16\text{m}$ after which the loss grows.

Figure 3-5: Total VA Impact @ 40% Rebooking



The 1,500-limit exhibits no negative total VA impact through 2023 and 2024, but a $\$1\text{m}$ VA impact emerges, around 2025, as the visitor recovery takes hold.

Regionally, the distribution of the VA impacts remains constant across all years considered. The impacts follow a similar pattern as that of the peak demand results for all visitor limits and rebooking loss proportions. Of the direct VA impacts, 71% is received in the Ruapehu District, however, shows a smaller share of 37% for the total VA impacts. For Taupo District, it accounts for 28% of the direct impact, this share also falls to 22% for the total VA impact. The wider regions of rest of Manawatu-Whanganui, rest of Waikato, rest of New Zealand are not heavily impacted directly (combined less than 1%), however, through the flow-on effects, receive 41% of the total impact.

For example, with a visitor limit of 600 with 40% rebooking loss, in 2023, Ruapehu and Taupo have direct VA impacts of $-\$0.60\text{m}$ (71% of total direct impact) and $-\$0.24\text{m}$ (28%), respectively. Under the total VA impact, the impact for Ruapehu is $-\$0.70\text{m}$ (37% of total VA impact), Taupo $-\$0.41\text{m}$ (22%), and rest of New Zealand $-\$0.69\text{m}$ (37%).



The VA impacts associated with the different timeframes will also have associated employment impacts. These are linked to the economic impacts, and the profile and distributions over time are also consistent. The profiles are summarised in Appendix 5

At the upper end of the employment impacts (600-limit), the employment losses are modelled at between 34 and 43. At the bottom end of the spectrum, the modelling suggests that there is no impact, and up to 9 job losses across the economy. Most of these employment effects are at the local level, within Ruapehu and Taupo.

3.3 Wider Economic Impacts

In addition to the economic impacts associated with the revenue streams, the visitor limits could lead to a loss of visitors, and visitor spending to the local economy. The lower visitor spending (vs the base estimates) translates into less local activity and fewer supported jobs. These related to spending like guided tours and hiking equipment and supplies, restaurants, accommodation, and related retail spending. Although, it is not known whether the visitors and spending are lost to the local economy (due to the visitor limits), we can estimate the associated VA and employment impacts and then comment on the scale.

A key objective of the visitor limits is the sustainable management of the TAC. If introducing the visitor limits is successful in protecting the trail, then the long-term viability is supported. In turn, this will support local business activities over the long run. Creating a premium product/experience could lead to higher spending by visitors in the wider economy, offsetting short term losses. However, such dynamics are long term, and beyond the scope of this assessment.

This economic assessment considers the short term, economic impacts and has a Ruapehu and Taupo Districts focus. As mentioned earlier, the assessment considers the effects (locally) of the lost visitor spending. While that spending might be lost to the local economies, those transactions could be received elsewhere in NZ. Therefore, the NZ-wide impacts are likely to be marginal or neutral.

To assess this, the potential economic impact of visitor spending was modelled with the VA results across each visitor limit scenario shown in Table 3.13. The table shows the direct and total VA impact for each visitor limit and rebooking losses. That is the VA loss from tourist spending for each limit compared with visitor numbers of the scenario with no visitor limits. The lost visitor spending is based on average visitor spending data (per day, on visitor products), with adjustments for the items discussed in the preceding section, and the estimated reduction in visitors.

The results show that:

- At a 20% rebooking setting:
 - The introduction of visitor limits ranging from 600 to 1,200 results in a total direct VA impact ranging from -\$4.51m to -\$0.55m, with no impact on the 1,500 limit.
 - The total VA impact, including indirect and induced impacts, ranges from -\$9.84m at the 600 limit to -\$1.19m for the 1,200 limit, with no impact to the 1,500 limit.

- At a 30% rebooking setting:
 - The introduction of visitor limits ranging from 600 to 1,200 results in a total direct VA impact ranging from -\$5.07m to -\$1.59m, with no impact on the 1,500 limit.
 - The total VA impact ranges from -\$11.06m at the 600 limit to -\$3.48m for the 1,200 limit, with no impact to the 1,500 limit.
- At a 40% rebooking setting:
 - The introduction of visitor limits ranging from 600 to 1,500 results in a total direct VA impact ranging from -\$5.63m to -\$1.15m.
 - The total VA impact ranges from -\$12.28m at the 600 limit to -\$2.51m for the 1,500 limit.

Regionally, the direct impacts are focused on the Ruapehu and Taupo Districts, which depending on the rebooking setting, are comparatively more impacted at the lower visitor limits. The largest negative impact, is at the 600-limit with 40% rebooking setting, has a direct VA impact to Ruapehu of between -\$2.24m and -\$3.39m. When the indirect and induced VA impacts are included, this decreases further to -\$2.88m for Ruapehu and -\$5.86m for Taupo.

Table 3.13: VA Impacts of Visitor Limits on Visitor Spending at Peak Demand

	600 Limit	800 Limit	1,000 Limit	1,200 Limit	1,500 Limit
Direct Value Added - 20% Rebooking Loss					
Ruapehu District	-\$ 1,795,000	-\$ 1,270,000	-\$ 740,000	-\$ 215,000	\$ -
Taupo District	-\$ 2,715,000	-\$ 1,920,000	-\$ 1,125,000	-\$ 330,000	\$ -
Rest of Manawatu-Whanganui	\$ -	\$ -	\$ -	\$ -	\$ -
Rest of Waikato	\$ -	\$ -	\$ -	\$ -	\$ -
Rest of New Zealand	\$ -	\$ -	\$ -	\$ -	\$ -
Total	-\$ 4,505,000	-\$ 3,185,000	-\$ 1,865,000	-\$ 545,000	\$ -
Total Value Added - 20% Rebooking Loss					
Ruapehu District	-\$ 2,310,000	-\$ 1,630,000	-\$ 955,000	-\$ 280,000	\$ -
Taupo District	-\$ 4,690,000	-\$ 3,315,000	-\$ 1,940,000	-\$ 565,000	\$ -
Rest of Manawatu-Whanganui	-\$ 170,000	-\$ 120,000	-\$ 70,000	-\$ 20,000	\$ -
Rest of Waikato	-\$ 315,000	-\$ 220,000	-\$ 130,000	-\$ 40,000	\$ -
Rest of New Zealand	-\$ 2,355,000	-\$ 1,665,000	-\$ 975,000	-\$ 285,000	\$ -
Total	-\$ 9,840,000	-\$ 6,955,000	-\$ 4,070,000	-\$ 1,190,000	\$ -
Direct Value Added - 30% Rebooking Loss					
Ruapehu District	-\$ 2,015,000	-\$ 1,555,000	-\$ 1,095,000	-\$ 635,000	\$ -
Taupo District	-\$ 3,050,000	-\$ 2,350,000	-\$ 1,655,000	-\$ 960,000	\$ -
Rest of Manawatu-Whanganui	\$ -	\$ -	\$ -	\$ -	\$ -
Rest of Waikato	\$ -	\$ -	\$ -	\$ -	\$ -
Rest of New Zealand	\$ -	\$ -	\$ -	\$ -	\$ -
Total	-\$ 5,065,000	-\$ 3,905,000	-\$ 2,750,000	-\$ 1,590,000	\$ -
Total Value Added - 30% Rebooking Loss					
Ruapehu District	-\$ 2,595,000	-\$ 2,000,000	-\$ 1,410,000	-\$ 815,000	\$ -
Taupo District	-\$ 5,275,000	-\$ 4,070,000	-\$ 2,865,000	-\$ 1,655,000	\$ -
Rest of Manawatu-Whanganui	-\$ 190,000	-\$ 145,000	-\$ 105,000	-\$ 60,000	\$ -
Rest of Waikato	-\$ 355,000	-\$ 270,000	-\$ 190,000	-\$ 110,000	\$ -
Rest of New Zealand	-\$ 2,645,000	-\$ 2,040,000	-\$ 1,435,000	-\$ 830,000	\$ -
Total	-\$ 11,055,000	-\$ 8,530,000	-\$ 6,000,000	-\$ 3,475,000	\$ -
Direct Value Added - 40% Rebooking Loss					
Ruapehu District	-\$ 2,240,000	-\$ 1,840,000	-\$ 1,445,000	-\$ 1,050,000	-\$ 455,000
Taupo District	-\$ 3,385,000	-\$ 2,785,000	-\$ 2,190,000	-\$ 1,590,000	-\$ 690,000
Rest of Manawatu-Whanganui	\$ -	\$ -	\$ -	\$ -	\$ -
Rest of Waikato	\$ -	\$ -	\$ -	\$ -	\$ -
Rest of New Zealand	\$ -	\$ -	\$ -	\$ -	\$ -
Total	-\$ 5,625,000	-\$ 4,630,000	-\$ 3,635,000	-\$ 2,640,000	-\$ 1,150,000
Total Value Added - 40% Rebooking Loss					
Ruapehu District	-\$ 2,880,000	-\$ 2,370,000	-\$ 1,860,000	-\$ 1,350,000	-\$ 590,000
Taupo District	-\$ 5,855,000	-\$ 4,820,000	-\$ 3,785,000	-\$ 2,750,000	-\$ 1,195,000
Rest of Manawatu-Whanganui	-\$ 210,000	-\$ 175,000	-\$ 135,000	-\$ 100,000	-\$ 45,000
Rest of Waikato	-\$ 390,000	-\$ 320,000	-\$ 255,000	-\$ 185,000	-\$ 80,000
Rest of New Zealand	-\$ 2,935,000	-\$ 2,420,000	-\$ 1,900,000	-\$ 1,380,000	-\$ 600,000
Total	-\$ 12,275,000	-\$ 10,105,000	-\$ 7,930,000	-\$ 5,760,000	-\$ 2,505,000

A large share of the indirect and induced impacts will be spread across the wider New Zealand economy. This reflects the linkages of the effected Ruapehu and Taupo Districts to other parts of the national economy from the spending of tourists in the local areas. However, this loss in economic activity may be countered by the lost visitors choosing to substitute TAC visitation with other tourist experiences or spending more time across other regions in New Zealand. Therefore, while the local economy is likely to experience a significant negative impact, the true economic impact on the New Zealand economy is likely to be marginal or neutral.

The impacts of the visitor limits on visitor spending, in terms of employment (MECs), are shown in Table 3.14. This covers the loss in employment which would be sustained by the economic activity which the visitor spending would sustain.

Table 3.14: Employment Impacts of Visitor Limits on Visitor Spending at Peak Demand

	600 Limit	800 Limit	1,000 Limit	1,200 Limit	1,500 Limit
Direct Employment - 20% Rebooking Loss					
Ruapehu District	-38	-27	-16	-5	0
Taupo District	-50	-35	-21	-6	0
Total	-88	-62	-36	-11	0
Total Employment - 20% Rebooking Loss					
Ruapehu District	-40	-28	-16	-5	0
Taupo District	-61	-43	-25	-7	0
Rest of Manawatu-Whanganui	-2	-1	-1	0	0
Rest of Waikato	-3	-2	-1	0	0
Rest of New Zealand	-17	-12	-7	-2	0
Total	-122	-86	-51	-15	0
Direct Employment - 30% Rebooking Loss					
Ruapehu District	-42	-33	-23	-13	0
Taupo District	-56	-43	-30	-18	0
Total	-98	-76	-53	-31	0
Total Employment - 30% Rebooking Loss					
Ruapehu District	-45	-34	-24	-14	0
Taupo District	-69	-53	-37	-22	0
Rest of Manawatu-Whanganui	-2	-1	-1	-1	0
Rest of Waikato	-3	-2	-2	-1	0
Rest of New Zealand	-19	-15	-10	-6	0
Total	-137	-106	-74	-43	0
Direct Employment - 40% Rebooking Loss					
Ruapehu District	-47	-39	-30	-22	-10
Taupo District	-62	-51	-40	-29	-13
Total	-109	-90	-71	-51	-22
Total Employment - 40% Rebooking Loss					
Ruapehu District	-50	-41	-32	-23	-10
Taupo District	-76	-63	-49	-36	-16
Rest of Manawatu-Whanganui	-2	-2	-1	-1	0
Rest of Waikato	-3	-3	-2	-2	-1
Rest of New Zealand	-21	-17	-14	-10	-4
Total	-152	-125	-98	-71	-31

The table reports the direct employment, and total employment, associated with the different visitor limits and rebooking settings:

- At a 20% rebooking setting:

- Implementing visitor limits ranging from 600 to 1,500 leads to a reduction in direct employment ranging from 88 to 0 MECs.
- The total employment decrease ranges from 122 to 0 MECs.
- At a 30% rebooking setting:
 - The introduction of visitor limits results in a decrease in direct employment ranging from 98 to 0 MECs.
 - The total employment decrease ranges from 137 to 0 MECs.
- At a 40% rebooking setting:
 - Visitor limits setting to a reduction in direct employment ranging from 109 to 22 MECs.
 - The total employment decrease ranges from 152 to 31 MECs.

These findings highlight the economic impacts of implementing visitor limits on the TAC, in terms of the VA and employment contribution of tourists beyond the TAC visitation activities directly. The direct VA and total VA demonstrate the impact on the local and regional economies, highlighting the wider impacts to job creation and income generation. The analysis underscores the importance of carefully considering the appropriate visitor limits, as it significantly influences the economic impacts. The impacts are also expected to be felt at the local level. Considering the small nature of the Ruapehu economy, the local impacts will be considerable. In the Ruapehu context, the largest decline is broadly equal to a 0.4% decline in the local economy.

3.4 Concluding remarks

The analysis of the visitor limits under the three rebooking settings reveals the impacts in VA and employment terms. The more stringent limits have the highest VA and employment impacts, and over time, these will grow to between \$3.98m and \$4.96m. The spread shows the potential effects of the rebooking approach. The rebooking settings show the potential behaviour of users, and how they might respond. At other end of the spectrum is the visitor limits that can still allow total visitor numbers close to levels observed pre-Covid. As the recovery takes hold, the higher visitor limits will start to inhibit further growth above historic levels. Once this happens there will be some economic impacts associated with foregone growth. However, this needs to be traded-off against the objectives associated with limiting growth.

Generally, the visitor limits will reduce the scale of economic effects associated with visitors and their spending. Importantly, this relates to the transactions and the flow-on (supply chain) effects of those transactions. This assessment should not be treated as a cost-benefit analysis, and VA (GDP) should not be interpreted as a 'benefit'. VA is a measure of economic activity and does not capture or reflect non-market values. In the context of the TAC, the visitor limits could also consider other costs and benefits, like:

- Health and wellbeing effects to users,
- Values associated with connecting with nature,
- The economic values generated by fostering social connections and promoting cultural cohesion,
- Protecting environmental values, and
- Maintaining and protecting (and limiting) the use levels (i.e., avoiding overcrowding).



Considering the recovery from COVID-19, the findings highlight the significance of visitor and their spending on economic activity and sustaining employment in the local economy. The analysis contextualises the trade-off between visitor limits across rebooking loss proportions, and the economic impacts when formulating strategies for the hiking track's management which can strike a balance that promotes sustainable tourism while optimising the economic benefits for the region. Part of the balancing process it involves acknowledging that large portions of the economic impacts are localised, falling mostly on the small local economies.



Appendix 1: Summary of DoC Visitor Modelling

The analysis is based on visitor projections provided by DOC for each visitor limit and rebooking assumptions. The modelling approach used by DoC is briefly summarised to provide context. It should be noted that it was beyond the scope of this assessment for M.E to evaluate, critique or modify DoC's modelling. However, we did peer review an earlier version.

The modelling is based on peak of visitor activity on the TAC which was the 2018/19 hiking season where around 146,000 visited the trail over a 12-month period. The model projects annual visitor numbers under each of the five visitor limits. The data from the peak year is split monthly to reflect seasonal visitation patterns. As such the projection is done by month by month, with annual demand the sum of all the months. Monthly visitor demand is calculated as follows:

Monthly Visitor Demand =

$$\text{Raw Demand} - \left(\text{Raw Demand} \times \frac{\text{Clear weather days per month}}{\text{Weekdays per month}} \times \text{Percentage Loss from Shifting} \right)$$

- Raw demand is set at the daily limit multiplied by the average number of clear weather days within each given month. The raw demand for each month is then reflective of the visitor limit being assessed. For the off-peak winter season (May to October) where average visitor activity falls under all the visitor limits, the minimum of either daily visitor limits or estimated users, is used.
- Clear weather days per monthly is based on weather advisory data and historic precipitation averages. This reflects the average days for each month where bad weather does not prevent the safe use of the TAC.
- Weekdays per month is used for calculating the loss under the limits as it is assumed that weekend days are when most visitation occurs. As such it assumes that weekend days will be used up to each limit with the excess visitors shifting to weekdays, when it is assumed that there is capacity.
- The percentage loss from shifting is used to reflect the proportion of visitors who will be lost from being unable or unwilling to move their visitation to a day with capacity. These are set and measured at three separate levels of 20%, 30% and 40%, and remain constant across all months and visitor limits.

The sum of monthly visitor demand provides the number of visitors to the TAC within a year which reflects the projected visitation under each of the five visitor limits across the three percentage loss proportions in a year which resembles the historical peak demand. From here the revenue projections are calculated using the visitor projections. The revenue is calculated using the proportion of visitors who use transport concessionaires and the proportion of those on 1 or 2 way shuttles. This is based on survey data and data from the shuttle operators.



Appendix 2: MRIO Modelling Assumptions

The following assumptions were made in order to run the input-output analysis:

- The analysis is based on the series of visitor projections provided by DOC for each visitor limit and rebooking loss assumption. Annual values are used, and the impacts are calculated based on the within the year in which they are expected to occur. The years themselves reflect the hiking season, thus starts in 2023 for the 2023/24 season.
- This projected revenue is allocated to 109 economic sectors with 5 regions (Ruapehu District, Taupo District, rest of Manawatu-Whanganui region, rest of Waikato region, and rest of New Zealand) in an input-output model which has been customised for the local economy using a 2020 base year.
- The proposed environmental management fee of \$1.60 per person is to be collected by the concessionaire and held in a trust for funding kaitiaki rangers and is not Crown revenue. Decisions have not been made yet about when the environmental management fee will be applied. In the modelling the fee is assumed to be allocated to the regional distribution of concessionaire operators within the heritage and artistic activities classification (which covers nature reserves and conservation parks operation).
- It is estimated that the clients using concessionaires' services make up 90% of total visitors. Within this, 90% of concessionaires are using two-way and the other 10% on one-way concessions. The two-way concessions are at a rate of \$55 per person, and \$45 per person for the one-way concessions. This level is set as it is expected that concessionaires will put up their prices once the environmental management fee and 0.60 increase in transport fee to 4.10 come into effect. One third of the concessionaires will not comply with the new fees due to the fact that their concession conditions won't come into effect until 2026. However, the visitor volumes these concessionaires carry are negligible compared to the big players. Therefore, no adjustment has been made fees are applied to all visitors using concessionaires.
- Crown revenue from the activity, of \$4.10 per person, is allocated according with profile of central government spending contained within the base of the MRIO model. Only crown revenue assumed to be from international tourists is assessed. This due to changes crown revenue from domestic tourists paying the activity fee being a transfer within the New Zealand economy. The proportion from international tourists is based on the TAC's visitor numbers from the 2021/22 season as it assumed that the 60,500 visitors that season were mainly domestic due COVID-19 border restrictions. This provides an approximation of domestic demand with visitors above this level assumed to be additional international tourists.
- It is assumed that the direct impact is received in the Ruapehu District (72%) and the Taupo District (28%). This was made using a sample of concessionaires from the 2018/19 season, where the number of concessionaires per operator was given for the month of March. The proportions were allocated by the number of concessions within each region, depending on the concessionaire company's location. For simplicity, these were limited to those which were either in the Ruapehu or Taupo Districts given the high likelihood that the majority of transport concessionaire operators operate from the districts bordering Tongariro National Park. While there are some operators which are based outside of the districts, these represented a small proportion of the sample (less than 5%). Furthermore, it is acknowledged that the concessionaire operator characteristics may vary from outside the sample whether within the other months of the 2018/19 season or in the years since.
- For the assessment of the visitor impacts over 2023 to 2026, DOC provided estimates for the tourism market recovery within their modelling from 2022 forecasts by TECNZ for international



visitor return to New Zealand. This was extended to assume full recovery in 2026. The rates for the recovery of tourist demand used is shown in the following table. Using these rates applied to peak demand from 2018-19, an estimate of the TAC's activity without visitor limits was generated. As the projections of visitors under each limit was also based on this peak year, it was assumed that the visitor numbers with no limits acts as an upper limit for each year. As such it is assumed that the numbers of visitors under each limit will be capped at the number of visitors under no limit for each of the years. The difference between the economic activity sustained by the visitor numbers with no limit and the projected number of visitors under each limit provides the measure of comparison for which the economic impact of each visitor limit is assessed.

Year	Proportion of pre-COVID visitors	Visitor Numbers with No Limit
2023	56.5%	92,257
2024	81.4%	125,655
2025	96.3%	144,316
2026	100%	146,264

- The employment projections are modelled using and measured in Modified Employee Counts (MECs). This measure is based on Statistics New Zealand's Employment Count (EC) statistic but also includes an estimate of the number of working proprietors. An approximation of 0.79 FTEs per MECs can be applied, however, this varies significantly across industries.
- As the IO model uses 2020 as a base year, the projected spending inputs to the model are deflated to 2020 terms. From here, the IO model value added outputs are reinflated to present terms, while the employment outputs reflect the 2020 proportions of gross output per MEC without reflation. Therefore, the linkages within the modelled economy may not reflect intersectoral changes since the base year such as impacts of COVID-19 to the economy.
- No discounting is applied to the value added results for future years. Furthermore, future inflation is not accounted for across the assessed timeline.



Appendix 3: Considerations Around IO Modelling

One of the strong points of input-output modelling is that the results are easy to interpret. Similarly, IO models are easy to use and cost effective to develop for different areas. However, IO analysis is not without limitations, despite being widely applied in New Zealand and around the world. The most common limitations relate to the historical nature of IO Tables. We use IO tables derived from recent Supply and Use Tables. Therefore, they may not accurately reflect the current sectoral relationships in the economy.

With reference to IO modelling in general, a key assumption is that input structures of all industries (i.e., technical relationships) are fixed. In the real world, however, technical relationships will change over time. These changes are driven by new technologies, relative price shifts, product substitutions and the emergence of new industries. For this reason, IO analysis is generally regarded as suitable for short-run analysis, where economic systems are unlikely to change greatly from the initial snapshot of data used to generate the base IO tables. In addition to the 'fixed structure' assumption, other important assumptions (and limitations) of IO models are:

- **Constant return to scale:** This means that the same quantity of inputs is needed per unit of output, regardless of the level of production. In other words, if output increases by 10 per cent, input requirements will also increase by 10 per cent.
- **No supply constraints:** IO assumes there are no restrictions to inputs requirements and assumes there is enough to produce unlimited products.
- **The model is static:** No price changes are built in meaning that dynamic feedbacks between price and quantity (e.g., substitution between labour and capital) are not captured.

The following indicators are used to measure economic impact:

- **Value added** measures all payments to factors of production (land, labour and capital), and excludes all purchases of intermediate inputs. It broadly equates with gross domestic product (GDP) as a measure of economic activity on the national level, and gross regional product on the regional level.
- **Employment** is measured in Modified Employee Count years (MECs). This is the number of full-time and part-time employees as well as working proprietors on an annual basis. This provides a measure of the labour demand associated with the estimate level of economic activity. Note that additional MEC-years do not necessarily require that additional persons be actually employed. It may mean existing employees or proprietors work longer hours to complete the additional work.

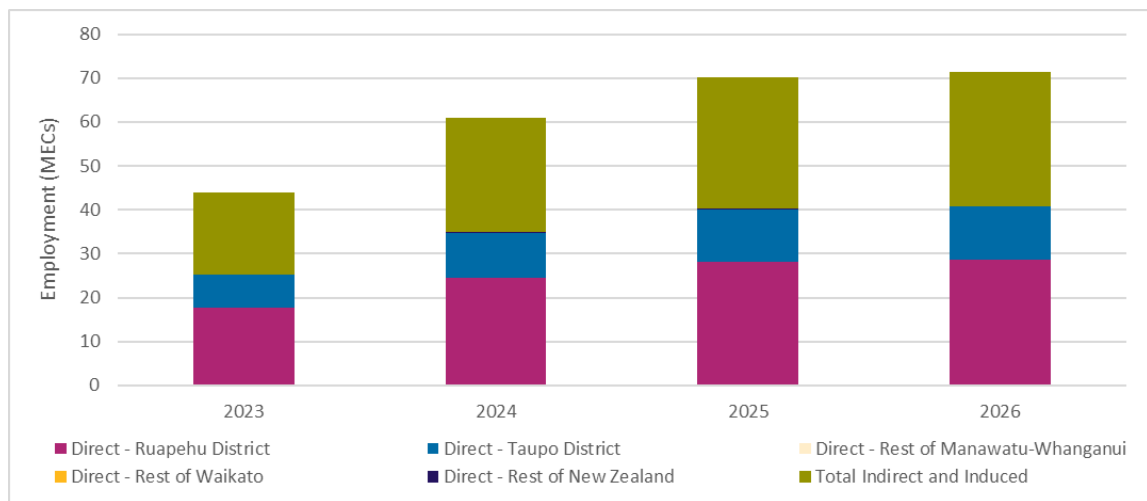


Appendix 4: Employment Impacts of TAC with No Visitor Limits 2023-2026

The figure provides an overview of the employment impacts of the TAC with no visitor limits from 2023 to 2026. It highlights the direct employment figures in various regions and the total indirect and induced employment resulting from the TAC's operations.

Examining the direct employment numbers, we can observe the employment levels in the Ruapehu District and the Taupo District. In the Ruapehu District, the direct employment starts at 18 in 2023 and gradually increases to 29 in 2026. Similarly, the Taupo District experiences an upward trajectory, with direct employment ranging from 7 in 2023 to 12 in 2026. These figures demonstrate the job creation potential of the TAC's activities in these regions. Furthermore, the table indicates that the Rest of Manawatu-Whanganui, Rest of Waikato, and Rest of New Zealand regions do not see direct employment impacts from the TAC during the specified period. In addition to direct employment, the total indirect and induced employment figures capture the broader employment effects resulting from the TAC's operations. These impacts also experience an increase over the four-year period, with the total indirect and induced employment rising from 19 in 2023 to 30 in 2026. This reflects the cascading employment opportunities generated by the TAC, extending beyond direct job creation.

Employment Impacts of TAC with No Visitor Limits 2023-2026



The total employment impact of the TAC, including direct, indirect, and induced employment, starts at 44 MECs in 2023, rising to 61 and 70 in 2024 and 2025, respectively. The total employment impact peaks at 71 MECs in 2026.

Appendix 5: Employment Estimates (temporal)

The total employment impact of each of the visitor limits and rebooking proportions is shown in the table below, covering the employment impact, across the direct, indirect, and induced effects. Employment is measure in MEC terms and shows the number of employees associated with the economic activity modelled for each limit-level and rebooking setting. That is, the employment impacts show the level of employment associated with the VA levels. The trends observed follow that of the VA impacts described above but in employment terms.

Total Employment Impacts over time

Visitor Limit	2023	2024	2025	2026
Complete Closure	-44	-61	-70	-71
Total Employment - 20% Rebooking Loss				
600 Limit	-8	-24	-33	-34
800 Limit	0	-14	-23	-24
1000 Limit	0	-4	-13	-14
1200 Limit	0	0	-3	-4
1500 Limit	0	0	0	0
Total Employment - 30% Rebooking Loss				
600 Limit	-12	-28	-38	-39
800 Limit	-3	-20	-29	-30
1000 Limit	0	-11	-20	-21
1200 Limit	0	-2	-11	-12
1500 Limit	0	0	0	0
Total Employment - 40% Rebooking Loss				
600 Limit	-16	-33	-42	-43
800 Limit	-9	-25	-34	-35
1000 Limit	-1	-18	-27	-28
1200 Limit	0	-10	-19	-20
1500 Limit	0	0	-8	-9

In 2023, the negative impact on employment of the daily visitor limits is at its lowest because the recovery is underway, and the effects of the limits are not being felt yet. With the exception of the complete closure scenario, the 600 limit is projected to be the only limit which results in a negative employment impact across all of the rebooking settings in the short term, with between 8 and 16 MECs lost. The 800 and 1,000 limits are not projected to result in a negative employment impact under 20% rebooking loss, however, under a 40% loss, they have negative employment impacts of 9 and 1 MECs, respectively under the short term. Clearly the rebooking is a driver of the effects. The two largest visitor limits (least constraining) avoid negative employment impacts in 2023, as under the assumptions, both limits can accommodate the lower level of visitor demand.

The employment impact rise over time, as the visit-limits start to impact TAC users in line with the recovery period. Once fully implemented, the employment impacts will vary, ranging between -34 and -43 for the 600-limit, up to 0 and -9 at the 1,500 limit.