

# **MONITORING THE EFFECTS OF AIRCRAFT OVER-FLIGHTS ON VISITORS TO THE FOX AND FRANZ JOSEF GLACIER VALLEYS, WESTLAND *TAI POUTINI* NATIONAL PARK, NEW ZEALAND**

**A REPORT PRESENTING RESULTS FROM THE 2015 VISITOR SURVEY**

**PREPARED FOR**  
DEPARTMENT OF CONSERVATION, North and Western South Island Region

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*Photograph 1 (Cover) Helicopter over Franz Josef Glacier (Jude Wilson)*

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## Executive Summary

Documented assessments of the effects of aircraft over-flights on visitors to Westland's Fox and Franz Josef Glaciers date back to 2000, following the development of a nation-wide standard operating procedure (Booth et al., 1997) for monitoring potential social impacts on public conservation lands. The Department of Conservation (DOC) now has sound longitudinal data tracking the effects of over-flights in the two target valleys, and is able to use the results of this monitoring to inform some of its management planning.

The present monitoring report (2015) was prompted by changing conditions in both glacier valleys and, in particular, new foot access constraints at Fox Glacier since May 2014. As has been the case in the Franz valley since April 2012, in order to facilitate continued access for glacier guiding companies, the number of permitted aircraft landings on the glacier has been increased. With guided access to both glaciers now dependent on air transport, and consequential increases in the number of over-flights in both valleys, the 2015 monitor provides additional longitudinal data measuring impacts of over-flights on non-guided visitors using the Fox and Franz Josef Valley walks.

### Approach

The 2015 monitoring survey was based on the Department's SOP for monitoring the effects of aircraft over-flights (Booth et al., 1997) and implemented over two eight-day periods in late December 2014 / early January 2015 and early-mid February 2015. Visitors were surveyed on the Fox and Franz Josef Glacier Valley walks.

A total of 1600 people were surveyed across the two sites, divided between the first (44.4%) and second (55.6%) survey periods. During the survey period, a total of 3012 flights (take-offs) were recorded (based on a survey of Glacier aircraft operators), representing a total of 6024 glacier valley over-flights (3175 at Franz Josef Glacier; 2849 at Fox Glacier).

The weather encountered in 2015 in both survey periods was generally fine. Only three of the ten days in the first survey period, and two days in the second survey period were wet with no flight activity. The relatively high number of clear weather days allowed for a higher number of completed surveys than was possible in other recent monitoring years.

### Key findings

#### Aircraft over-flight activity data

1. Reflecting the amenable weather conditions, the detailed flight records collected for the Franz Josef Valley in 2015 show a modest increase (22%) in flight activity to that recorded during the 2014 monitor. Documented over-flights at Fox Glacier increased from 1210 when last assessed in 2013, to 2849 in 2015.
2. In 2015, 60 per cent of all valley over-flights occurred between 9am and 3pm. At Franz Josef Valley, the greatest concentration of over-flights was between midday and 3pm; at Fox Glacier Valley, the greatest concentration of over-flights was between 9am and midday. Across both valleys, approximately one quarter of over-flights occurred between 3pm and 6pm.

3. The most common flight was by helicopter (92%), and lasted either 10 minutes (27%) or 30 minutes (28%). The most common flight purpose was a scenic flight with snow landing (44%). One third (34%) of all flight paths were up and down Franz Josef Glacier Valley; 29 per cent flew up and down the Fox Glacier Valley.
4. Nominal classification of relative aircraft over-flight activity revealed that 4 per cent of survey respondents experienced 'low' flight activity levels; seven per cent experienced 'medium' levels; 26 per cent experienced 'high' levels; and 63 per cent experienced 'very high' levels. There was some variation between the two valley settings, with those visiting Franz Josef more likely than those visiting Fox Glacier to experience 'high' and 'very high' flight activity levels.

#### Visitor survey: The effects of aircraft over-flights

5. The demographic profile (age, gender, visitor origin) of the sample appears to be similar to that reported in 2013 and 2014. Approximately one third of respondents were aged between 20-29 years, and 18 per cent of respondents were aged 60 and above. Just over 75 per cent of respondents were from outside New Zealand (down slightly from 80% in 2014), and the common international countries of residence were United Kingdom, Australia and Germany.
6. As was the case in the 2013 and 2014 monitoring reports, responses to the open-ended question asking what visitors liked most about their experience at the glacier tended to emphasise the natural character of the glacier, overall scenic amenity and identified a number of natural (non-glacier) features that are enjoyed. Frequent reference was made to enjoyment of the walk to the glacier, appreciation of free and easy access, the high quality of the track, and the waterfalls. These latter (non-glacier specific) features appear to have increased in salience between 2013 and 2015.
7. Eleven per cent of nominated 'dislikes' (aspects visitors 'liked least' about their experience) and nine per cent of all respondents, specifically mentioned 'aircraft'. In 2013 (the last time both valleys were monitored), 12 per cent of visitors surveyed specified 'aircraft' among their dislikes. It is important to emphasise, however, that 'aircraft' was not the most common 'dislike' mentioned. Three other themes were more prominent, including comments relating to the glacier experience (39% of responses), many of which focussed on disappointment about access to the glacier, the difficulty of the walk to the glacier, and the presence of too many people. Other themes related to the Westland National Park experience and the natural environment more generally (i.e., not glacier-specific). Altogether, just over one quarter (27%) of the 2015 survey respondents reported that there was 'nothing' they liked least.
8. When prompted, the vast majority (96%) of respondents reported noticing aircraft during their visit to the glacier valleys, the same result as in 2013 and 2014. Franz Josef respondent estimates of the number of over-flights experienced (M=10.04) was also highly consistent with the 2013 and 2014 findings (M=10.74 and M=10.01 respectively), while Fox Glacier respondents in 2015 (M=7.67) reported encountering more over-flights than their 2013 counterparts (M=6.28).

9. As reported in 2013 and 2014, visitors at both sites experienced more aircraft than they had expected prior to arriving at the destination. At Franz Josef, 42 per cent of respondents (a similar proportion to that observed in 2014 and down from 48% in 2013) reported experiencing more aircraft than they had expected. At Fox, over one third of respondents said they had experienced more aircraft than they had expected – a significant increase since 2013 when the figure was 27 per cent. Those reporting that aircraft activity levels were ‘about the same’ as they had expected (approximately one third) is relatively consistent between the two sites and across the most recent monitors.
10. Approximately half (46% and 49% respectively) of Franz Josef and Fox respondents indicated that the potential existed for their visits to be ‘spoiled’ by the presence of aircraft activity in the valley. Of these, thirteen per cent stated that ‘any’ aircraft activity would spoil their visit; one quarter of those visiting Franz and 17 per cent of those at Fox said ‘the amount I’ve noticed on this visit’; and 43 per cent of those at Franz, and 50 per cent of those at Fox reported that their visits would be spoiled at ‘double the amount noticed on this visit’.
11. Approximately two thirds of respondents at both valleys (63% and 65% respectively) felt ‘neutral’ in terms of how aircraft had affected their visits, a small increase on the 2013 and 2014 figures. At Franz Josef Glacier Valley, 24.5 per cent of 2015 respondents reported being ‘annoyed’ by aircraft – a small decrease compared to 2013 (26.2%) and 2014 (25.7%). At Fox Glacier Valley, 22.2 per cent of visitors said they were ‘annoyed’ by aircraft, a marked increase since 2013 (16.8%).
12. There is some evidence from both valley settings that those who *did* report feeling ‘annoyed’ by aircraft over-flights show a lower degree of annoyance, and felt less strongly about the how aircraft detracted from their visits, than was apparent in 2013 and 2014.



## Introduction

This report is the tenth aircraft monitoring report to be carried out in Westland *Tai Poutini* National Park since 2000. The results of on-going monitoring of the effects of flights in the glacier valleys is designed to inform management planning decisions relating to the levels of aircraft activity in these areas. This 2015 survey uses the same methodology as in the three previous surveys (in 2009, 2013 and 2014). The 2015 survey was undertaken in the Franz Josef and Fox Glacier Valleys.

The collapse of the front 70 metres of the Franz Josef Glacier in mid-2012 made foot access unsafe and changes were made to the National Park Management Plan to allow a temporary increase in the number of flights utilising the Franz Josef Valley to facilitate glacier access for the glacier hiking companies (DOC, 2012). The 2013 survey found that the level of visitor annoyance with aircraft activity had increased to 26.2 per cent (up from 16.5% in 2009) in the Franz Josef Valley. It was suggested that managers and operators might examine options for addressing such factors as the expectations visitors hold about the glacier experience and revisit the appropriateness of the current number of aircraft landings permitted and the specific flight paths used. While, to date, no additional limits have been placed on the levels of aircraft activity, nor changes made to flight paths, visitor expectations have been addressed through the erection of signs alerting visitors to the high aircraft activity in the two valleys. In 2014 the survey was repeated in the Franz Josef Valley only and reported an annoyance level of 25.7 per cent.

In March 2014 a change in the river flow from the terminal face of Fox Glacier affected foot access to the glacier. Between early April and late July the guide company was able to ferry clients across the river using a Unimog or raft; foot access onto the ice became unfeasible from 20 July. As a result of these changes, the number of flights utilising the Fox Glacier Valley have increased (similar to the changes in Franz Josef Valley in 2012) to facilitate glacier access for the guide company.

This report presents the 2015 survey results for the two glacier valleys. The Franz Josef Valley results are compared with those from the 2013 and 2014 surveys; the Fox Glacier results are compared with the 2013 results. The report follows a similar structure to the 2013 and 2014 reports (Espiner & Wilson, 2013; 2014).

## Background

Beginning in 2000, the Department of Conservation undertook a five year programme of aircraft monitoring to assess how aircraft activity affected visitors' experiences of Westland *Tai Poutini* National Park. Visitors on four walks within the Fox and Franz Josef valleys were surveyed at approximately the same time each summer from 2000 to 2004. The survey was based on the Department of Conservation's Standard Operating Procedure (SOP) for aircraft monitoring (Booth, Jones & Devlin, 1999). The SOP was generally adhered to, except for a few minor variations in some years. A monitoring report was produced at the end of each year's monitoring period. The current threshold for management intervention is a visitor annoyance level of 25 per cent (personal communication, Ian Wightwick, DOC Technical Advisor (Recreation), April 29, 2013).

The results over these five years were broadly consistent and some general trends were evident across the four sites. Levels of visitor annoyance with aircraft on the Franz Josef Glacier Valley walk and Fox Glacier Valley walk varied from 13-25 per cent between years, and did not exceed the management threshold for management intervention of 25 per cent. Levels of annoyance with aircraft on the two higher level tracks (Robert's Point and Chalet Lookout) were more pronounced and showed greater variability between years. The proportion of visitors annoyed by the level of aircraft activity at Robert's Point varied between 30 per cent and 50 per cent (mean of 43%) over the five years and at Chalet Lookout between 18 per cent and 33 per cent (mean of 25%). Thus there was reason for management concern at both these sites, with mean levels being at or above the 25 per cent threshold.

In 2005 the survey was undertaken after consultation with the Mount Cook/Westland National Parks Resident Aircraft Air Users' Group. Four key changes were incorporated into the survey design:

1. Visitor responses to aircraft activity were surveyed across a full spectrum of levels of aircraft activity, by including samples of visitor perceptions on days of no and low aircraft activity as well as on days of medium to high aircraft activity. Previous surveys had deliberately sampled only on days when there were relatively high numbers of flights.
2. A distinction was made between fixed-wing and rotary-winged aircraft - visitors were specifically asked if they had noticed aeroplanes and/or helicopters.
3. Basic demographic information was obtained from respondents to gain a better understanding of visitors - this information comprised age, gender, nationality and visit group size.
4. A large Department of Conservation sign was placed in a prominent position at the beginning of the Robert's Point Walk for the duration of the survey period warning visitors that they were likely to experience aircraft activity on the walk (*'PLEASE NOTE. This track follows a helicopter flight path. You may experience aircraft activity during your walk.'*)

The survey was repeated in 2009 using the 2005 methodology and question format. In 2013 the only changes to these two previous surveys (i.e., the points noted above) were:

- Surveying was undertaken only on days that there was some aircraft activity
- Instead of nationality, respondents were asked 'where they normally lived?'
- DOC staff were unable to locate the Robert's Point sign, so this was not used
- The survey was split into two survey periods

The 2013 and 2014 surveys were prompted by rapidly changing conditions in the Franz Josef Valley. In particular, since July 2012, safe access onto the glacier via the valley floor had been prevented by narrowing and collapse at the Glacier's terminal face. In order to facilitate continued access for glacier guiding companies, amendments were made to the Westland *Tai Poutini* National Park Management Plan, temporarily increasing the number of permitted aircraft landings on the glacier. A consequence of this temporary change was a substantial increase in the number of over-flights, and a 2013 monitoring report undertaken in both glacier valleys found significant increases in visitor impact in the Franz Josef Valley. Given the focus of the enlarged impacts, the decision was made to repeat the survey in the Franz Valley

only in 2014. In 2015 the situation had not changed in the Franz Josef Valley with glacier access only possible by helicopter. Changes to the terminal face of Fox Glacier in 2014 (after the 2014 survey was completed) triggered a further increase in over-flights in the Fox Glacier Valley, prompting the current (2015) reiteration of the survey. Thus, there is now data for Franz Josef Valley across three consecutive years (2013, 2014 and 2015) and data for Fox Glacier Valley for two years (2013 and 2015).

The same methodology and survey was used in 2015 (as in 2014); the only change was the addition of a filter question to Question 6 (Q6A) which asked if there was an amount of aircraft activity that would spoil a visit. This change was the result of the number of 2013 and 2014 survey respondents who had indicated some difficulty in answering this question (13% in 2013; 11.9% in 2014). In the 2015 survey, only those indicating that their visit would be spoiled by aircraft activity answered Question 6B ('What amount of aircraft activity would spoil your visit?').

A copy of the 2015 survey form is contained in Appendix 1.

## Method

The 2015 Aircraft Monitoring survey was conducted in two phases during the summer. Across the survey period, a total of 800 visitors to the Franz Josef Valley and 800 visitors to the Fox Glacier Valley were surveyed about the effects of aircraft on their visit. The total number of flights (i.e., take-offs) recorded during the survey period was 3259.

### Survey periods and the survey site

In 2015, surveying was undertaken during two eight-day survey periods. The first of these ran from 27<sup>th</sup> December 2014 to 3<sup>rd</sup> January 2015; the second from 6<sup>th</sup> to 13<sup>th</sup> February 2015. This split in surveying was based on similar considerations, as noted in the 2013 and 2014 monitoring reports:

- Having two survey periods minimised the potential effects of encountering an extended adverse weather pattern that spanned the survey periods
- Ensuring representation of New Zealand visitors in the immediate post-Christmas domestic holiday period
- Logistical issues relating to the implementation of the survey over an extended period

The weather encountered in both 2015 survey periods was generally very good, although as expected the conditions were more mixed during the first survey period. Altogether, surveying was possible on 5 of the 8 survey days in the first survey period, and on 7 of the 8 survey days in the second survey period. There was one day in the second survey period in which flights were not possible in the Franz Josef Valley because of morning fog. A more detailed summary of the weather conditions experienced, the number of flights and surveys completed each day during the two survey periods is presented in Appendix 2.

The 2015 Franz Josef Valley survey point was beside the small footbridge just beyond the Forest Viewpoint; this was the same site as used in both 2013 and 2014 (Photograph 2).

Visitors returning from their walks were intercepted before they entered the forested part of the track, approximately 10 minutes from the car park.

Since 2014 there had been some changes in the final glacier viewpoint in the Franz Josef Valley. In 2014 the viewpoint was 500 metres from the terminal face of the glacier: during the 2015 surveys several alternative viewpoints were accessible. For the first 3 days of the first survey period visitors could walk to within 250 metres of the terminal face, and to within 300 metres for the remaining days. There were 2 days in the first survey period in which access was more restricted than this. A new viewpoint was established prior to the second survey period (250 metres from the terminal face, but at a different place than the previous viewpoint) and this was accessible during the entire survey period. The return walk time from the car park to the terminal face was unchanged (approximately 1.5 hours). The only other difference (since 2014) was the erection of a second sign part way up the valley (near Trident Falls) alerting visitors to high aircraft activity in the valley (Photograph 3).



*Photograph 2 Survey site Franz Josef Valley (Jude Wilson)*



*Photograph 3 Aircraft sign at Trident Falls (Jude Wilson)*



The Fox Glacier survey point was located along a flat section of track approximately five minutes' walk from the car park (Photograph 4). This site was selected because visitors returning from their walks had safely crossed an area of track along which rock fall was possible, but were not yet in sight of the car park. At Fox Glacier, the glacier access track had changed significantly since the survey was last undertaken there (in 2013). The glacier valley track takes visitors to a high point overlooking the terminal face of Fox Glacier from a distance of 200 metres. This track crosses a number of small creeks which restrict access after heavy rain; there was one day in each of the 2015 survey periods in which access was restricted. A sign alerting visitors to high aircraft activity was erected at the beginning of the Fox Glacier Valley track prior to the 2015 survey (Photograph 5).



Photograph 4 Survey site Fox Glacier Valley (Jude Wilson)



Photograph 5 Aircraft sign Fox Glacier Valley (Jude Wilson)

## Sampling

Consistent with the previous iterations of the aircraft effects survey, convenience sampling was employed (see Booth *et al.*, 1999). The surveyors introduced themselves by name to passing visitors, explained that they were doing visitor surveys for the Department of

Conservation, and asked the person/people they had approached if they had a few minutes to complete a survey. All surveyors wore Department of Conservation name badges. Respondents were given a survey form, clipboard and pen and asked to self-complete the survey form. The surveyors were on hand to assist if necessary. In some cases the wording before the first question had to be explained as visitors did not always understand where Westland *Tai Poutini* National Park was - more specifically they were instructed to think about their walk up the glacier valley on that particular day.

Three surveyors were employed for each survey period, two of whom were present throughout both survey implementation periods. Logistically, it was most effective to utilise two or three surveyors at the survey site as this meant survey distribution could be staggered, allowing surveyors to check that each form was complete as it was returned.

The survey took most people fewer than five minutes to complete. On completing the survey, participants were asked what time they had started out on their walk that day and this time, along with the current time and date, were recorded on the survey form along with a survey number. This data was used to calculate the amount of time participants had been exposed to any aircraft activity (see below for description of aircraft activity calculations) and was designed to present a more accurate measure than simply taking the recommended time suggested for each walk on the track signage (as had been done in surveys up until 2009). The same calculation method was employed in both 2013 and 2014.

Participants were then thanked for their time and input, and were informed that the survey was part of an on-going monitoring project.

### Flight records & aircraft activity calculations

Detailed flight records were collected from the ten aircraft operators who were regularly operating in the glacier area during the survey period. The template used for this data collection in 2015 is shown in Appendix 3. The only changes in this form, from that used in 2013 and 2014, was in the categories of Flight Purpose which were changed to reflect the addition of glacier access flights for guided hikes on the Fox Glacier.

In previous survey years (i.e., prior to 2013) these data were open to considerable interpretation as the flight path and purpose were asked in an open-ended question. To simplify data entry for the air operators, standardise the data collection, and to minimise any interpretation errors, a number of fixed category options were devised (with the assistance of the selected flight operators). The categories used in 2015 incorporated five 'flight paths' and seven 'flight purposes'.

As might have been expected, the number of flight days (and the number of flights on those days) was related closely to the weather conditions. In the first survey period in 2015, surveys were undertaken on five of the seven days on which there was aircraft activity; in the second survey period, surveys were undertaken on seven of the eight days in which there was aircraft activity (on one of these days there was only one flight recorded).

Table 1 shows some key details of the total 3259 flight take-offs during the two 2015 survey periods (full details can be found in Appendix 4). The greater number of flights in the second survey period is a reflection of the more amenable weather conditions during this time.

Helicopter flights ( $n=2985$ ) outnumbered fixed-wing flights ( $n=274$ ) by a factor of eleven to one in 2015.

*Table 1 Key flight details 2015*

Variable	Details	Number	Percentage
Survey Period	1	1446	44.4
Survey Period	2	1813	55.6
Type of Aircraft	Helicopter	2985	91.6
	Fixed wing	274	8.4
Most common Duration	10 minutes	868	26.6
	30 minutes	898	27.6
Most common Flight Path	Up/down Franz Josef	1097	33.7
	Up/down Fox Glacier	934	28.7
Most common Purpose	Scenic flight/snow landing	1443	44.3
	Ice Explorer	566	17.4

In 2015, the same methods were used to calculate the number of over-flights as in 2013 and 2014. The 3259 flights recorded in 2015 were take-offs only and each one represents two flight movements (out and return). Using the flight path records for flights crossing the two glacier valleys (i.e., Flight Paths 1-4) it was possible to calculate how many over-flights there were each glacier valley. Take-offs following Flight Path 1 and 2 represented one flight in each glacier valley, whereas take-offs following Flight Paths 3 and 4 represented two flights in only one glacier valley (Table 2). Altogether, 247 take-offs were discounted from these calculations as they were either sky dive flights ( $n=226$ ), which did not fly in the glacier valleys, or were scenic/service flights which followed slightly different flight paths and for which insufficient detail was recorded ( $n=21$ ).

*Table 2 Calculation of over-flights from flight path data*

Flight Path		Take-offs ( $n=3012$ )	Overflights Franz Josef ( $n=3175$ )	Overflights Fox Glacier ( $n=2849$ )
FP 1	Up Fox Glacier/down Franz Josef	396	396	396
FP 2	Up Franz Josef/down Fox Glacier	585	585	585
FP 3	Up/down Fox Glacier	934	-	1868
FP 4	Up/down Franz Josef	1097	2194	-

## Data entry & analysis

Survey data were entered into an excel spread sheet during each survey period. These data were later transferred into SPSS for analysis.

Flight data were also entered into an excel spread sheets and sorted by date, flight path and time period, before being matched to the time periods visitors were present in Franz Josef and Fox Glacier Valleys. In order to approximate the levels of aircraft activity in the valley at the time of visitation, flight data were analysed according to five time periods across each day (Table 3). The greatest concentration of over-flights in the Franz Josef Valley was during Time Period 2 (1200-1459), whereas the greatest concentration of over-flights in the Fox Glacier Valley was in Time Period 1 (0900-1159). This distribution of over-flights in the Franz Josef Valley by time period was almost identical to that recorded in 2014.

There was a larger percentage of over-flights in Fox Glacier Valley in the earliest and latest time periods (i.e., before 0900 and after 1800). Altogether, the Franz Josef Valley experienced 327 more over-flights than the Fox Glacier Valley (across both survey periods).

*Table 3 Number of Franz Josef and Fox Glacier Valley over-flights by time period*

Period	Time	Franz Josef (n=3175)		Fox Glacier (n=2849)	
		Number	Percent	Number	Percent
0	Before 0900	230	7.2	380	13.3
1	0900 - 1159	962	30.3	870	30.5
2	1200 - 1459	1054	33.2	774	27.1
3	1500 - 1759	835	26.3	655	23.0
4	1800 -	94	3.0	170	6.0

Each visitor was also coded according to the time his or her survey was completed (and the time he or she had been in the valley) using the same time periods. All visitor surveys were completed between the hours of 0900 and 1800 which meant that the majority of visitor time spent in both glacier valleys was in Time Periods 1 and 2 (Table 4). In an attempt to survey some visitors outside these busier periods the surveyors began surveying in the Franz Josef Valley before 9.30am on two mornings, but found there to be almost no visitors present. The small number of visitors surveyed during Time Period 3 relates to surveys undertaken after 1630 (i.e., visitors surveyed at 1630 would have been in the valley from 1500 onwards). Encountering visitors whose valley walks took place after 1800 (i.e., during Time Period 4) would have necessitated surveying after 1900.

*Table 4 Surveys in each glacier valley by time period*

Period	Time	Franz Josef		Fox Glacier	
		Number	Percent	Number	Percent
0	Before 0900	6	0.8	-	-
1	0900 - 1159	416	52.0	357	44.6
2	1200 - 1459	320	40.0	374	46.8
3	1500 - 1759	58	7.2	69	8.6
4	1800 -	-	-	-	-

The number of over-flights occurring in each time period were subsequently coded according to 4 nominal 'flight activity' (intensity) categories:

- Low (1-29 flights)
- Medium (30-49 flights)
- High (50-69 flights)
- Very high (70+ flights)

Table 5 shows the distribution of flight activity by date and time period in the Franz Josef Valley. The grey shaded rows indicate days when surveys were undertaken at Franz Josef; the blue shaded cells indicate the time periods (n=17) when the visitors surveyed had been in the valley. These data show that the 17 time periods in which visitors were surveyed in the Franz Josef Valley represented 11 periods of 'very high' flight activity, 3 periods of 'high' flight activity and 3 periods of 'medium' flight activity.



Table 5 Franz Josef flight intensity by time period, date and survey days (highlighted)

Date	Time periods				
	0 < 0900	1 0900-1159	2 1200-1459	3 1500-1759	4 1800 >
27-Dec	L	L	L	L	-
28-Dec	M	H	VH	H	L
29-Dec	-	M	M	M	L
30-Dec	-	-	L	-	-
31-Dec	-	-	-	-	-
1-Jan	L	VH	VH	VH	L
2-Jan	L	VH	VH	H	-
3-Jan	L	VH	VH	VH	L
6-Feb	L	VH	VH	H	-
7-Feb	L	VH	VH	H	L
8-Feb	L	VH	H	H	-
9-Feb	-	-	-	-	-
10-Feb	M	VH	VH	VH	L
11-Feb	L	VH	VH	VH	L
12-Feb	L	L	VH	VH	L
13-Feb	L	VH	VH	VH	L

Table 6 shows the distribution of flight activity by date and time period in the Fox Glacier Valley. The grey shaded rows indicate days when surveys were undertaken at Fox Glacier; the orange shaded cells indicate the time periods ( $n=15$ ) when the visitors surveyed had been in the valley. These data show that the 15 time periods in which visitors were surveyed in the Fox Valley represented 7 periods of 'very high' flight activity, 6 periods of 'high' flight activity, 1 period of 'medium' flight activity and 1 period of 'low' flight activity.

Table 6 Fox Glacier flight intensity by time period, date and survey days (highlighted)

Date	Time periods				
	0 < 0900	1 0900-1159	2 1200-1459	3 1500-1759	4 1800 >
27-Dec	L	M	M	L	-
28-Dec	M	H	VH	H	L
29-Dec	L	H	VH	H	L
30-Dec	L	M	M	M	L
31-Dec	-	-	-	-	-
1-Jan	H	VH	H	H	L
2-Jan	L	H	M	L	L
3-Jan	M	VH	H	VH	L
6-Feb	M	H	M	L	L
7-Feb	L	VH	L	M	L
8-Feb	L	M	M	L	-
9-Feb	-	-	-	-	L
10-Feb	M	VH	VH	H	L
11-Feb	L	H	H	H	L
12-Feb	L	H	VH	H	L
13-Feb	L	H	H	H	L

Based on these calculations, the aircraft over-flight intensity categories were matched with each visitor's time spent in the Franz Josef or Fox Glacier Valleys.

Altogether, 74.2 per cent of the 2015 Franz Josef Valley surveys were undertaken during 'very high' flight activity periods and 18.5 per cent during periods of 'high' flight activity. Only 7.8 per cent of surveys were completed in a medium flight activity period; no surveys were completed during low flight activity periods (see Table 7).

Flight activity was more evenly distributed across flight activity levels in Fox Glacier Valley (see Table 6) and this is reflected in the distribution of surveys by flight activity level (Table 7). Slightly over half (52.5%) of Fox Glacier surveys were completed during periods of 'very high' flight activity and a further third (34%) were completed during periods of 'high' flight activity (Table 7).

*Table 7 Number of surveys undertaken in each valley, by flight activity level*

Flight Activity Level (within time period)	Franz Josef Valley (n=800)		Fox Glacier Valley (n=800)	
	Number	Percent	Number	Percent
Low (1-29 flights)	-	-	60	7.5
Medium (30-49 flights)	58	7.3	48	6.0
High (50-69 flights)	148	18.5	273	34.0
Very High (70+ flights)	594	74.2	419	52.5

It needs to be emphasised that this approach allows for an approximate level of aircraft exposure to be calculated for each visitor. It is not possible to determine with any precision, the number of aircraft in the valley at the time of each person's visit. Given the variations in flight path and purpose, and the complexities of time between take-off, glacier set-down, return to base, and return via alternative glacier valley, we believe too many sources of error are present to make judgements using mean number of flights per visitor hour (as was attempted in 2009).

### Sample size & margin of error

The sampling rationale in 2015 was to sample an equal number of respondents in each valley and by survey period (Table 8). The good weather experienced meant that the minimum number of respondents sought (500 respondents in each valley) was exceeded. In previous years 576 (2013) and 502 (2014) visitors were surveyed in the Franz Josef Valley and 454 (2013) visitors were surveyed in the Fox Glacier Valley.

*Table 8 Survey collection 2015*

	Franz Josef Valley	Fox Glacier Valley
Survey Period 1	386	411
Survey Period 2	414	389
Total	800	800

The total sample in 2015 (n=1600) gives a margin of error of +/- 2.5 %. This means that we can say, with 95% confidence, that any result presented falls within a 5% range of the proportions

calculated from the total sample. Where the analysis is limited to a sub-section of the total sample (i.e., one of Fox or Franz Josef Valley), the margin of error is +/- 3.5%.

Across all survey days, 148 of the visitors approached declined to be surveyed. Given the convenience sampling method employed, this does not indicate a response rate. A record of these refusals was kept with surveyors recording details of the person's age, gender, country of residence and reason for refusal (Table 9). The most common 'other' reason for refusal were not having their glasses with them and needing the toilet.

*Table 9 Details of visitor refusals 2015 (n= 148)*

<b>Descriptor</b>	<b>Details</b>	<b>Percentage</b>
Age	15-29 years	36.5
	30-49 years	37.8
	50-69 years	22.3
	70+ years	3.4
Gender	Male	51.4
	Female	48.6
Country of residence	New Zealand	12.2
	Overseas	87.8
Reason	No time	33.8
	Not interested	35.8
	Language difficulties	18.9
	Other	11.5

## Results

The following results section presents the demographic and travel group data first, before reporting the findings for questions in the order in which they appeared in the survey. Results are differentiated by glacier valley (i.e., Franz Josef and Fox Glacier results are presented separately) and related to flight data where relevant. The Franz Josef Valley results are compared with those from the 2013 and 2014 surveys; the Fox Glacier Valley results are compared with the 2013 results. Owing to the differences in sample size for each year monitoring has been conducted (see above), all comparative results are presented as percentages.

### Demographic and travel group data

#### Question 10 - Please tell us a little about yourself

Respondents were asked their age, gender, where they normally lived and how many people they were visiting the glacier with. The age distribution in 2015 (by valley) is presented first, then sample age data for each valley is compared by survey year.

Figure 1 shows that the age distribution of respondents was roughly similar in each of the glacier valleys although the visitors surveyed in the Franz Josef Valley were slightly younger than those surveyed in Fox Glacier Valley. The largest group of visitors in both valleys were aged 20-29 years (35% in Franz Josef; 28.9% in Fox Glacier). The larger percentage of young

people surveyed in Franz Josef Valley is likely associated with the large numbers visiting Franz Josef on backpacker buses (e.g., Kiwi experience, Stray, Contiki).

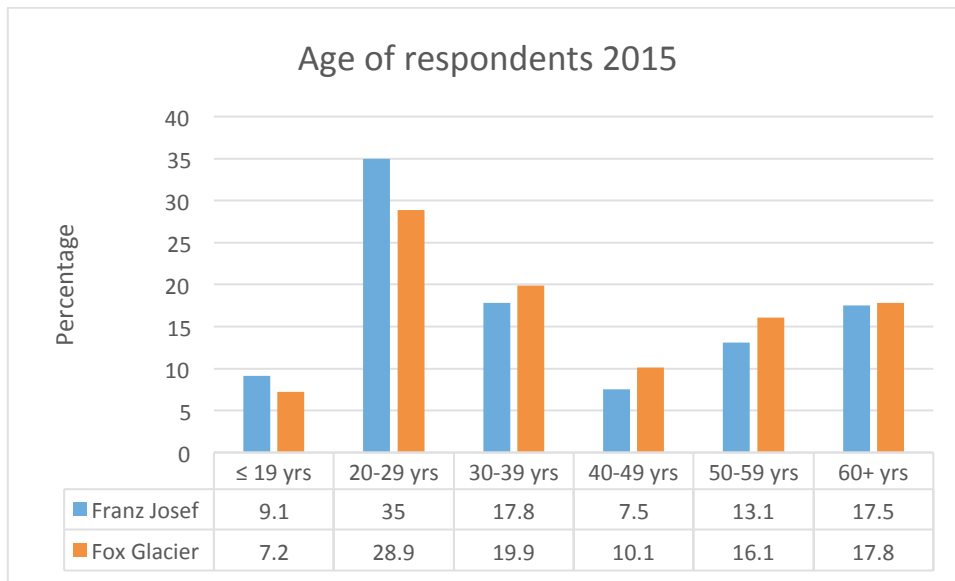


Figure 1 Age of respondents (n=1600)

Figure 2 compares the age distribution of the Franz Josef Valley sample across 2013, 2014 and 2015. The age distribution in all three years is roughly similar; compared with 2014 there were fewer visitors sampled in the 30-39 year and 40-49 year age groups and more visitors in the 20-29 year age group.

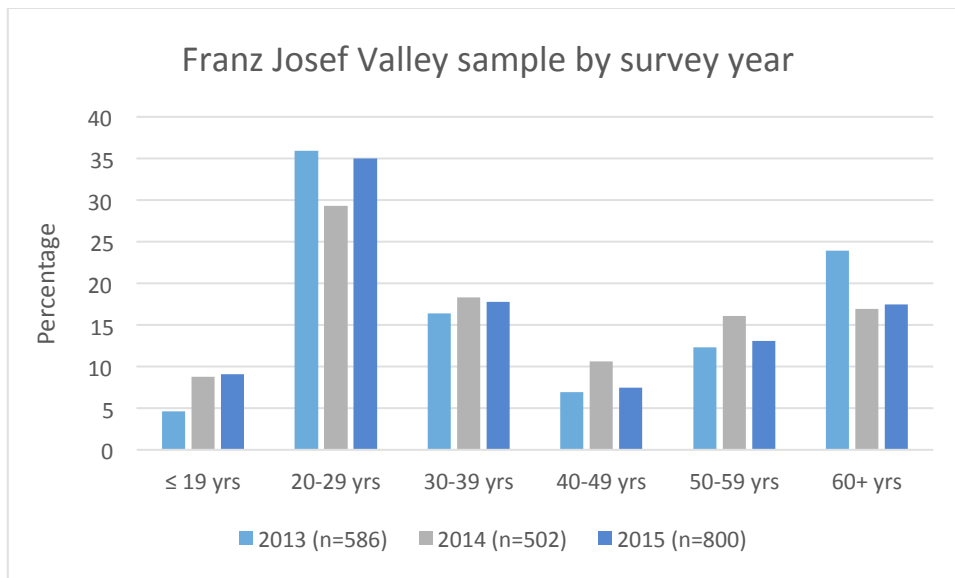


Figure 2 Age of Franz Josef Valley sample by survey year

Figure 3 compares the age distribution of the Fox Glacier Valley sample in 2013 and 2015. In 2015 there were more visitors surveyed from the two youngest age groups and fewer in all age groups over 30 years.

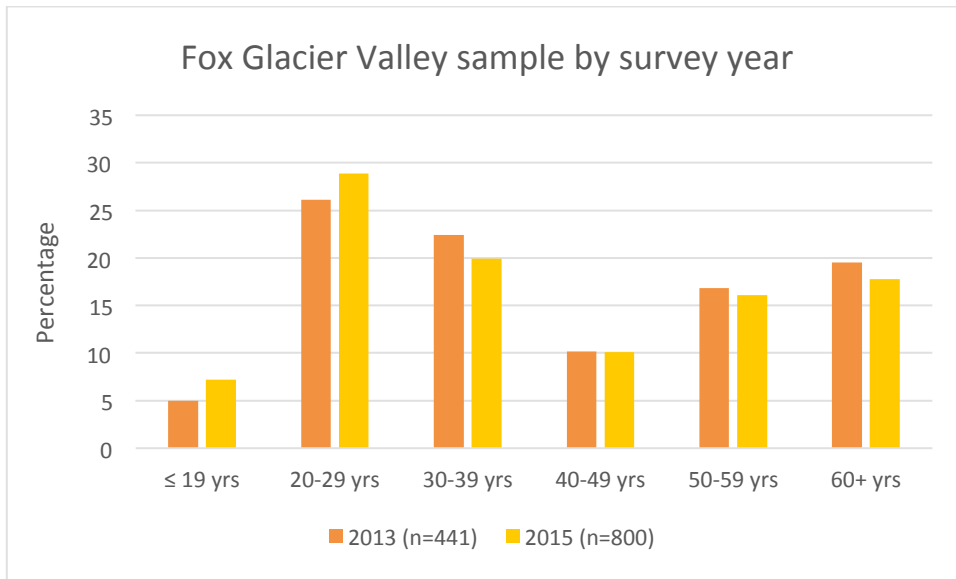


Figure 3 Age of Fox Glacier Valley sample by survey year

#### Gender

In 2015, men represented a fractionally higher proportion of respondents in Franz Josef (51.9%) while there were slightly more women surveyed at Fox Glacier (50.8%) (Figure 4). Overall, men represented 50.6 per cent of the sample in 2015.

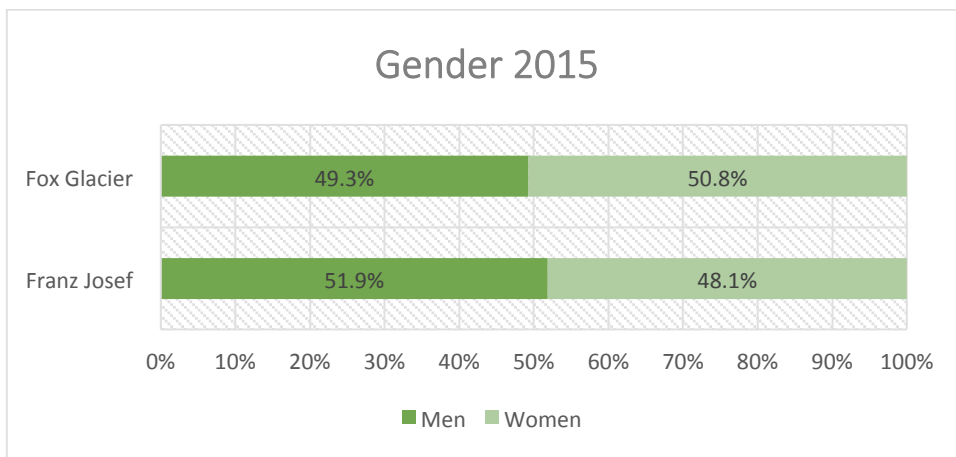


Figure 4 Gender (n=1600)

Table 10 compares the gender distribution of the survey samples, by valley and year and shows that the gender of the 2015 sample was more evenly distributed in both glacier valleys.

Table 10 Gender by valley and survey year

Year	Franz Josef		Fox Glacier	
	Men (%)	Women (%)	Men (%)	Women (%)
2013	52.2	47.8	54.7	45.3
2014	47.2	52.8	-	-
2015	51.9	48.1	49.3	50.8

*Where do you normally live?*

Altogether, the 1600 respondents in 2015 reported 46 countries of residence (this compares with 45 countries in 2013 and 35 countries in 2014). As Figure 5 shows, the largest single group of visitors surveyed in 2015 were New Zealand residents ( $n=382$ , 24%); the largest single group of international visitors were from the UK ( $n=224$ , 14%) followed by Australia ( $n=216$ , 13%) and Germany ( $n=212$ , 13%).

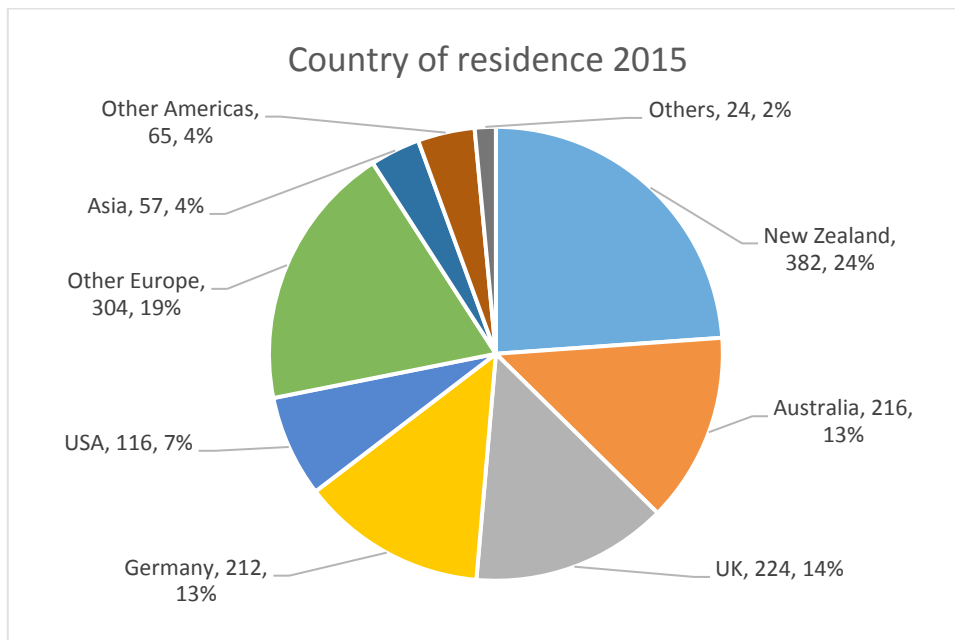


Figure 5 Country of residence total sample ( $n=1600$ )

New Zealand visitors represented almost a quarter of the survey sample (23.9%) in 2015, an increase on previous years (18.6% in 2013 and 19.3% in 2014). Almost two thirds (62.6%) of the New Zealand residents were surveyed in the first survey period.

In 2015 there were more New Zealand visitors surveyed at Fox Glacier (53.4%,  $n=204$ ) than at Franz Josef (46.6%,  $n=178$ ). New Zealand visitors represented 25.5 per cent of all visitors surveyed at Fox Glacier compared with 23.9 per cent of all visitors surveyed at Franz Josef. In 2013, New Zealand visitors also represented a slightly larger proportion of visitors surveyed at Fox Glacier (20.3%) compared with Franz Josef (17.3%).

Visitors from other Europe and Germany represented just under a third of all visitors in the 2015 sample (32.3%,  $n=516$ ); the most common countries of residence in 'Other Europe' were France ( $n=71$ ), the Netherlands ( $n=50$ ), Switzerland ( $n=34$ ), Denmark ( $n=24$ ) and Spain ( $n=20$ ). Altogether, in the 2015 sample, visitors from Europe (including UK) represented 20 different

countries (this compares with 23 in 2013 and 18 in 2014). A full list of the countries of residence of the 2015 sample is shown in Appendix 5.

Asian visitors were poorly represented in the sample (3.6%,  $n=57$ ), a slight decrease from 2014 (4.4%). In 2015, visitors surveyed represented 11 Asian countries with the largest group from Singapore ( $n=20$ ), followed by China and India (both  $n=9$ ) and Japan ( $n=5$ ). Visitors from Asia represented 9 countries in 2013 and 8 countries 2014.

In 2015, visitors from the Americas represented 7 countries (excluding USA); the largest group of these was from Canada ( $n=43$ ) followed by Brazil and Columbia (each  $n=6$ ). The only visitors from the Americas (excluding USA) surveyed in 2014 were from Canada and Brazil; in 2013 survey respondents represented 5 other American countries.

In 2015 the 'other' countries category included visitors from Israel ( $n=15$ ), South Africa ( $n=3$ ), New Caledonia ( $n=2$ ) and one each from Tahiti and Oman. Two respondents did not specify their country of residence.

Figure 6 shows the country of residence by survey year – this clearly shows an increase in New Zealand residents in the sample compared to previous years (noted above). Over the three survey years the percentage of visitors surveyed from the UK, Germany and the USA have fallen. The percentage of visitors from Australia and other Americas surveyed both fell in 2014, but recovered to represent a similar proportion of the sample in 2015 as in 2013. The proportion of visitors surveyed from Other Europe and Asia was consistent over the three survey years.

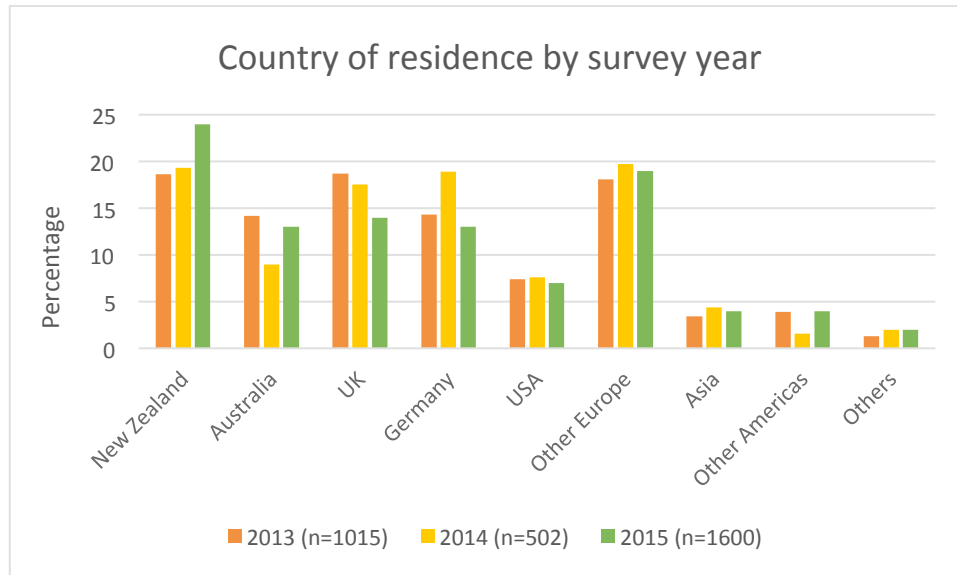


Figure 6 Country of residence by survey year (total sample)

Figure 7 shows the country of residence in 2015 by valley. There were more visitors from New Zealand (as noted above), other Europe (i.e., excluding Germany) and other Americas (i.e., excluding USA) surveyed in Fox Glacier Valley.

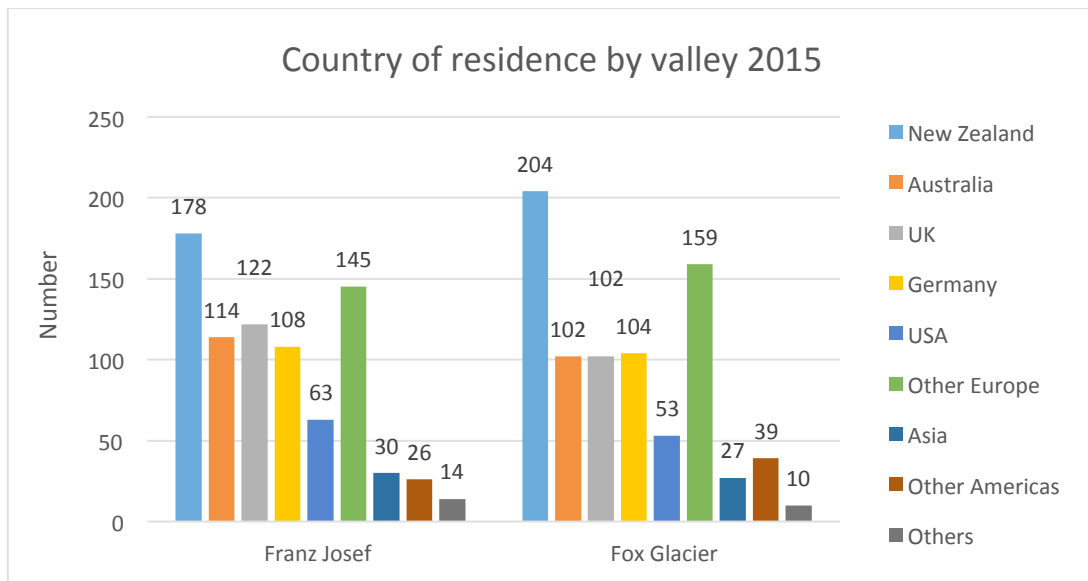


Figure 7 Country of residence by glacier valley

*How many people are in your group?*

Table 11 shows the key data describing group size in 2015. Slightly larger groups were encountered in the Franz Josef Valley (i.e., a greater range and larger mean). Group sizes in 2015 were similar to those reported in previous years in both valleys.

Table 11 Group size by valley

	Franz Josef	Fox Glacier
Range	1-42	1-25
Mean	3.16	2.7
Mode	2	2

The Westland *Tai Poutini* National Park Experience

Question 1 - What have you liked the most about your visit to Westland *Tai Poutini* National Park?

The initial questions in the aircraft monitoring survey required respondents to provide ‘open-ended’ responses to prompts about what they ‘liked the most’ and ‘liked the least’ about their visits. Altogether, the 1600 respondents recorded 2053 things they liked the most; these are reported and discussed below in respect of the total sample with the exception of ‘glacier specific’ category. These responses were coded according to same five categories as used in 2013 and 2014 (Figure 8):



1. Natural environment - included any responses which noted specific features of the natural world (e.g., waterfalls, rocks, bush, and so on), but the glaciers were not specifically noted
2. Glacier related - any comments in which the glaciers were specifically mentioned
3. Facilities and activities - comments that referred explicitly to activities in the area including tracks (other than the glacier valley track) and facilities (information, toilets, and so on)
4. Overall scenic amenity - broader more generic comments made about the experience (e.g., views, scenery, landscapes, and so on)
5. Other - any comments that did not fit the above categories

The largest category of responses with 760 comments (37% of all likes recorded) referred specifically to the glaciers, with respondents most commonly reporting that they liked ‘the glaciers’, ‘Franz Josef Glacier’, ‘Fox Glacier’, ‘the glacier walk’, and ‘easy and free access’ to glacier views. Twelve respondents at Fox Glacier and seven at Franz Josef liked how close they were able to get to the glacier. Other glacier ‘likes’ included seeing blue ice and seeing ice in the river.

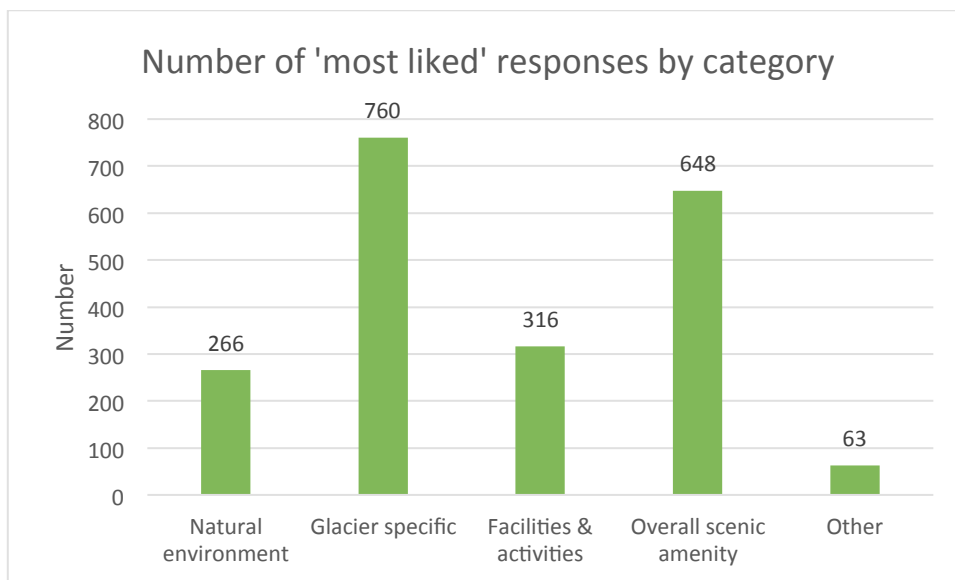


Figure 8 Number of ‘most liked’ responses by category (n=2053)

Aircraft activities at the glaciers were specifically mentioned as a ‘most liked’ aspect of their visit by 18 respondents. (At Franz Josef, six respondents mentioned their helicopter flights and one specified the heli-hike as ‘most liked’; at Fox Glacier, eight respondents noted their helicopter flights and three their heli-hikes as ‘most liked’.)

Figure 9 shows the distribution of most liked aspects of visits reported by those surveyed in 2013 (1267 likes reported), 2014 (641 likes reported) and 2015 (2053 likes reported). The percentage reporting a most liked aspect related to ‘overall scenic amenity’ has increased each year, while likes related to specific features of the ‘natural environment’ have fallen.

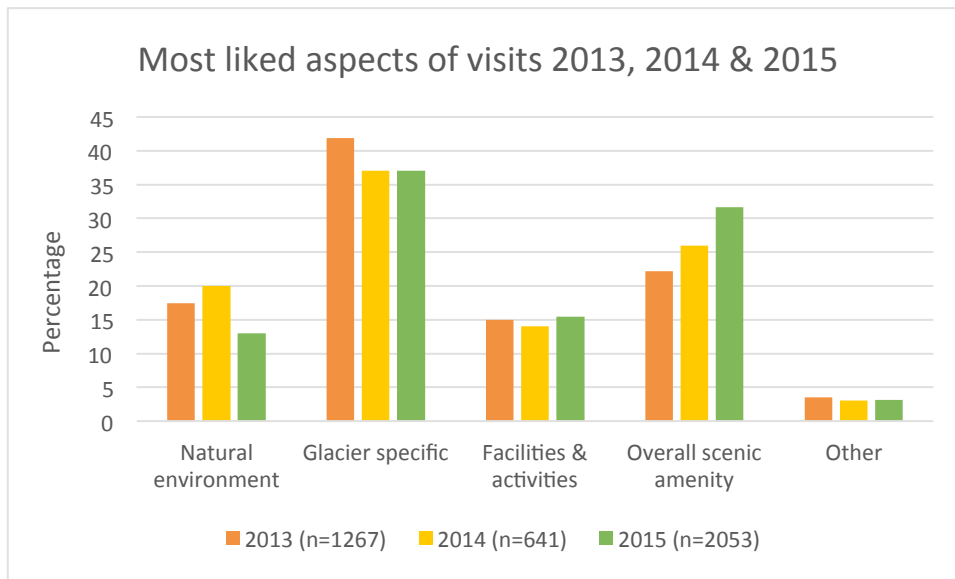


Figure 9 Most liked aspects of visit, by category and survey year

In 2015, the largest number of overall scenic amenity likes were for ‘scenery’ (noted 163 times), ‘views’ (noted 143 times), nature (55 times) ‘overall beauty’ (45 times) and ‘the landscape’ (41 times). Other comments reported as most liked described remoteness/solitude, unspoilt wilderness, peace/calm, vastness and rugged beauty.

The natural environment attracted 13 per cent of the most liked aspects in 2015. Waterfalls were the most liked feature (noted 82 times) followed by weather (75 times), rainforest/bush (40 times) and the river (22 times). Rocks were noted 22 times and the rock face at Fox Glacier Valley 16 times. Other natural features *liked* included the clean, fresh air, the terrain (and how rough it was), geological features, flora and fauna and that there was nothing poisonous.

‘Facilities and amenities’ were most liked by 15.4 per cent of respondents, with most of the comments relating to the tracks (without the glacier being specifically mentioned). These included comments on how ‘well built’ and ‘high quality’ the tracks were, the ‘varied walks’ available, and how well-signposted these were. The quality of facilities in the national park was recognised by many with free parking, lack of rubbish, the quality of visitor information and freedom to explore specifically noted. Six people liked the lack of commercialisation; five people liked the how natural the tracks were and the range of activities available was noted by several people. Other nearby places enjoyed included Lake Matheson (noted 25 times), and Okarito (4 times); activities enjoyed included sky diving (3 times), hot pools (2 times), hunting and gold-panning (once each).



*Photograph 6 Most liked – scenery and walking tracks (Jude Wilson)*



*Photograph 7 Most liked – Lake Matheson (Jude Wilson)*

Only three per cent of comments could not be coded into these four categories with the most common likes reported being ‘everything’ or ‘all of it’ and comments relating to other people (e.g., ‘lack of crowds’, ‘friendliness of other people’, and ‘being with family and friends’).

Question 2 - What have you liked the least about your visit to Westland *Tai Poutini* National Park?

Altogether, the 1600 respondents recorded 1399 things they liked the least about their visits. These responses were coded according to same five categories as used in 2013 and 2014 (Figure 10):

1. Aircraft - any mention of aircraft
2. Glacier experience - any comments in which the glaciers were specifically noted

3. Nothing - coded if respondents had specifically recorded a comment about disliking 'nothing' (e.g., 'none, N/A, all good)
4. Westland NP experience - broader comments referring to the overall experience with no specific reference to the glaciers
5. Natural environment - comments referring to the natural environment (e.g., the weather, insects)

The least liked aspects (dislikes) of visits are reported and discussed below in respect of the total sample, with the exception of the 'aircraft' and 'glacier experience' categories. For these two categories, the details of the 'least liked' aspects of visits reported were further coded by glacier valley. The coding of aircraft dislikes by glacier valley was undertaken in order to identify any differences in aircraft impact by valley for those reporting aircraft as an unprompted 'least liked' aspect of their visit. 'Least liked' glacier experience features were also coded by valley to reflect the differences in access, glacier views and the physical characteristics of the walk in each valley.

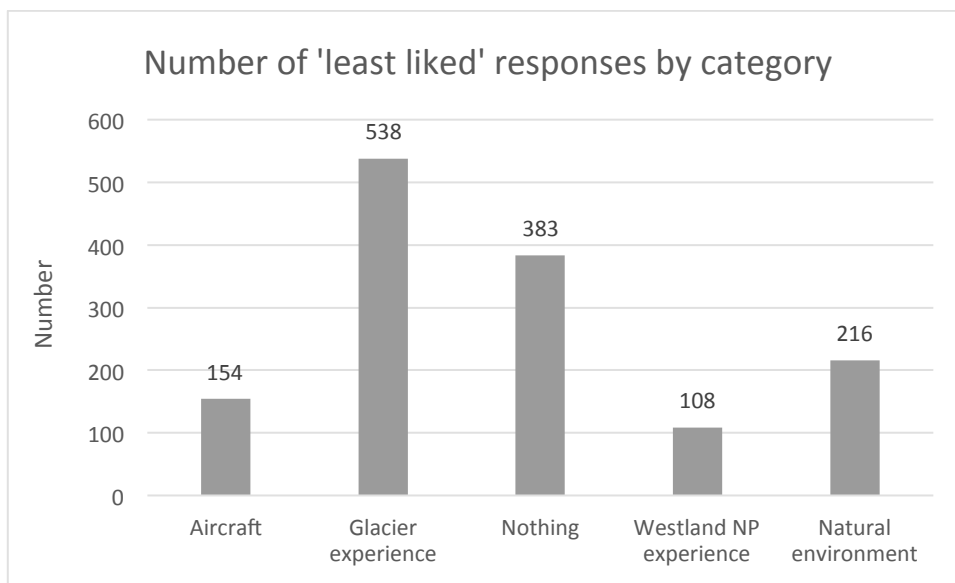


Figure 10 Number of 'least liked' responses by category (n=1399)

This question was unprompted and was asked before it became obvious to respondents that the survey focus was the effects of aircraft overflights. Altogether, 154 respondents (9.6% of the total survey sample) reported aircraft as something they liked the least about their visit (the same percentage as in 2013 and slightly down on the 10.4% in 2014). Overall, 'aircraft' accounted for 11 per cent of the total dislikes reported in 2015 (n=1399), a slight fall from the 12 per cent of total dislikes in 2013, but the same as in 2013 (Table 12). These differences are most likely a result of the survey only being done in the Franz Josef Valley in 2014 (where there was a high aircraft activity); in 2013 the Franz Josef Valley results were moderated by the Fox Glacier Valley results (e.g., in the Fox Glacier Valley aircraft represented 8% of dislikes reported and were reported by 6% of respondents, compared with 14% dislikes reported by 12% of respondents in the Franz Josef Valley).

Table 12 Aircraft 'least likes' by survey year

	2013	2014	2015
Aircraft as a % of dislikes reported	11.3	12.0	11.0
% of respondents reporting aircraft as a dislike	9.6	10.4	9.6

Altogether, of the aircraft dislikes reported, 78 respondents simply noted either 'helicopter' or 'constant helicopters' and 65 specifically referred to 'helicopter noise'. Almost twice as many respondents in the Franz Josef Valley reported aircraft as a dislike, particularly in respect of noise (Figure 11). The 11 aircraft dislikes in the other category included the impact of helicopters on the environment (noted 3 times), heli-hikes being cancelled (6 times), heli-hikes being booked out and the cost of flights (once each).

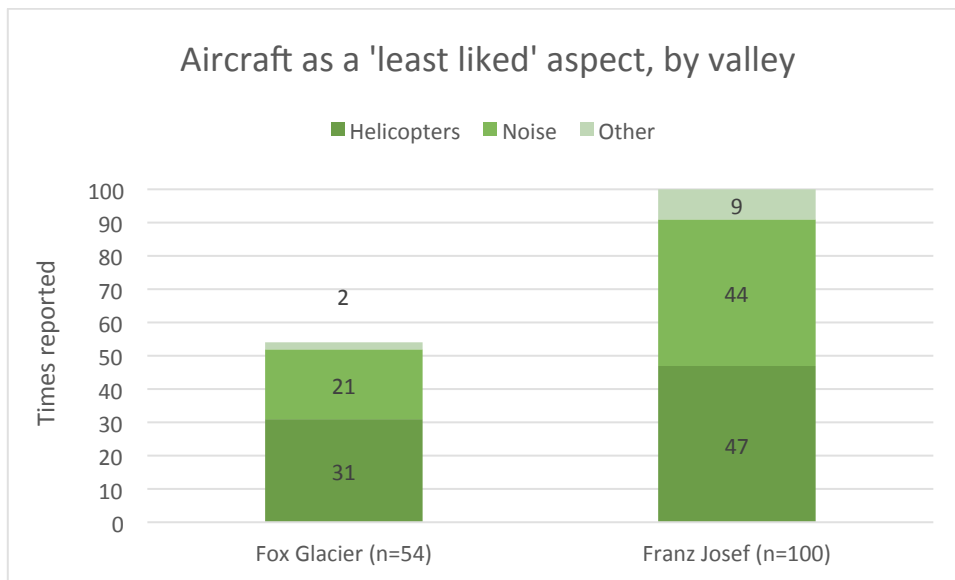


Figure 11 Aircraft as a 'least liked' aspect, by valley

In 2015 slightly more than a quarter (27.4%) of all respondents specifically recorded a comment stating that there was 'nothing' they liked the least about their experience (this attracted 31% and 27% of least liked responses in 2014 and 2013, respectively) (Figure 12).

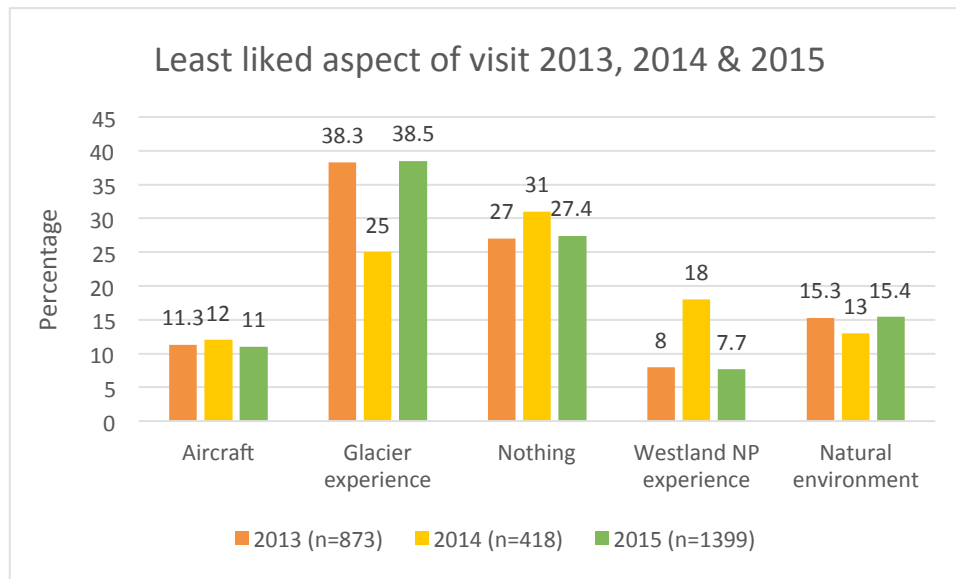


Figure 12 Least liked aspects of visit, by category and survey year

The next largest category of ‘least liked’ responses in 2015 were those related to the glacier experience specifically (38.5%); this was similar to the 2013 results, but significantly higher than the 25 per cent reported in 2014. The high number of glacier-related dislikes in 2013 was related to the number of surveys undertaken post-storm when there was no access to the Franz Josef Glacier Valley.

In 2015 the most common glacier experience ‘least liked’ comments related to glacier access, the difficulty of the walk and other visitors. The most reported glacier experience least likes, differentiated by glacier valley, are shown on Table 13. The majority of glacier-specific responses related to the distance of the glacier viewpoint from the glacier; not being able to get close enough was noted 95 times with other similar comments relating to not being able to go on the glacier without taking a flight or being on a tour (noted 22 times); the restrictions imposed by the rope barriers were specifically noted 21 times. The walk to the glacier was disliked in respect of the steepness/roughness of the track (particularly at Fox Glacier), the length of the walk (23 times altogether) and how hard the walk was (13 times altogether).

Table 13 Glacier experience ‘least likes’ by valley

Least liked aspect of glacier experience	Franz Josef	Fox Glacier	Total
Not getting close enough	63	32	95
Only access to ice by air	14	8	22
Rope barrier restrictions	12	9	21
Steepness/roughness of track	18	63	81
Length of walk	12	11	23
Difficulty of walk	6	7	13
Crowding	31	23	54
Other visitors’ behaviour	18	10	28





*Photograph 8 'Least liked' steep track and 'most liked' rock face at Fox Glacier (Jude Wilson)*



*Photograph 9 Visitors at Franz Josef Glacier viewpoint (Jude Wilson)*

Other glacier dislikes reported in 2015 included: crowding (noted 54 times ); the behaviour of other visitors (28 times); not enough parking (7 times Franz Josef, 3 times at Fox Glacier); colour of the glacier (8 times at Fox Glacier only); the size of the glacier (4 times Franz Josef, 9 times Fox Glacier) and a variety of facility complaints (no shade, poor signage, limited interpretation, lack of toilets in valleys, and lack of rubbish bins). Six people complained about rubbish and three people found their glacier experience 'too touristy'; others complained about track being closed after rain and the lack of closure signs on the road.

Altogether, 85 respondents expressed concern that the glaciers are receding.

The Westland National Park experience more generally attracted 7.7 per cent of all dislikes in 2015 (similar to 2013, but less than 2014) (Figure 12). In 2015 the most common dislikes reported related to prices, with petrol, food, accommodation, grocery and hut fees specifically mentioned. The lack of accommodation was noted by several respondents; 13 people mentioned either the lack of/limited availability of freedom camping options. Altogether, eight people thought it was over-commercialised; other dislikes were the roads (steep and winding,

long drives, gravel, speed bumps), the quality of village facilities and amenities, and litter. One respondent mentioned 1080 and one person complained about public holiday surcharges.

The natural environment accounted for 15.4 per cent of negative comments, similar to the previous two years. In 2015, the most common least liked aspect was the weather with rain noted 77 times, the weather more generally (37 times), cloud (13 times); three people complained about the heat. Sandflies were reported 77 times as a least liked aspect. The only other least liked things were falling rocks, dirty river water, crowds and lack of activity options on wet days.



*Photograph 10 Least liked - the weather (Jude Wilson)*

### Aircraft noticed by visitors

Question 3 - Have you noticed any aircraft during [this visit](#)? By aircraft we mean both helicopters and/or aeroplanes.

At Franz Josef, 95.9 per cent of respondents reported noticing aircraft and 4.1 per cent reported not noticing any aircraft (despite being surveyed when there was aircraft activity). The percentage noticing aircraft at Fox Glacier was similar (96.4% noticed aircraft, 3.6% did not). In some instances, people who reported *not* noticing aircraft misunderstood the question, thinking instead they were being asked if they had been *in* an aircraft.

Table 14 shows the number noticing helicopters and fixed wing planes at each survey site.



Table 14 Aircraft noticed during visit by type and valley

	Only Helicopters	Only Fixed wing	Noticed both
Franz Josef (n=767)	633	2	132
Fox Glacier (n=771)	633	0	138

Given that only 48 (1.5%) of the total number of over-flights recorded were by fixed wing aircraft it is probable that some respondents were inaccurate in their perceptions about the aircraft type. During both periods and at both survey sites the surveyors noticed very few fixed wing aircraft.

### Number of aircraft noticed

Question 4 - What number of aircraft have you noticed on this visit? Count each aircraft fly-over separately even if it was the same craft.

In 2013 there were a number of issues raised with regard to this question, notably the number of respondents recording a range of numbers or reporting that there were 'too many aircraft to count', 'lots', 'many' and a variety of other phrases to indicate an excessive number of aircraft. For analysis purposes, this latter group were coded as a separate group (with no number value assigned) and the remainder were coded as follows:

- If a range of numbers was reported the mid-point of these (or the higher side of mid-point) was recorded
- If the spread was only one number apart (e.g., 6-7) the higher number was recorded
- If more than a specific number was given (e.g., >20) the actual number value was recorded (i.e., 20)
- If respondents wrote 'unsure' or 'don't know' it was recorded as a non-response

The same conventions were followed in 2014 and again in 2015.

In 2015, the mean number of aircraft noticed in the Franz Josef Valley was 10.04 (Table 15). The calculation for mean number of flights excludes the 63 respondents who reported there were 'too many aircraft to count' (or similar comments) and the 31 respondents who indicated that they had noticed aircraft, but did not record the number they had noticed.

Table 15 Franz Josef Valley - mean number of aircraft noticed and excessive number noticed by survey year

	2013	2014	2015
Mean number of aircraft noticed	10.74	10.01	10.04
Respondents reporting 'too many aircraft to count' (or similar)	n=32, 6.1%	n=36, 7.9%	n=63, 8.5%

In 2015, the mean number of aircraft noticed in the Fox Glacier Valley was 7.67 (Table 16). The calculation for mean number of flights excludes the 49 respondents who reported there were 'too many aircraft to count' (or similar comments) and the 32 respondents who indicated that they had noticed aircraft, but did not record the number they had noticed.

Table 16 Fox Glacier Valley - mean number of aircraft noticed and excessive number noticed by survey year

	2013	2015
Mean number of aircraft noticed	6.28	7.67
Respondents reporting 'too many aircraft to count' (or similar)	n=4, 1%	n=49, 6.6%

In additional analysis, the number of aircraft noticed by respondents was divided into 4 categories: i) those reporting between 1 and 5 aircraft; ii) those reporting between 6 and 10 aircraft; iii) those reporting between 11 and 20 aircraft; and those reporting more than 20 aircraft (this includes the respondents who indicated an excessive number of aircraft). This analysis revealed a relationship between the number of flights noticed and a negative effect on the visitor experience (Table 17).

While the percentage of respondents reporting aircraft as a 'least liked' aspect increased as the number aircraft noticed increased, in both valleys the percentage reporting aircraft as 'least liked' was higher for all categories in the Franz Josef Valley.

Table 17 Number of aircraft noticed (in categories) by aircraft as a least-liked aspect

Aircraft noticed	Franz Josef (%) (n=100)	Fox Glacier (%) (n=54)
1-5 aircraft	6.2	2.2
6-10 aircraft	11.4	5.2
11-20 aircraft	18.9	14.3
>20 aircraft	24.8	22.1

### Expectation of aircraft numbers

Question 5 - Has the amount of aircraft activity you've noticed on [this visit](#) been - less/more/about the same/didn't know - than expected?)

Figure 13 shows that just over two-fifths of respondents (42%, n=322) in the Franz Josef Valley reported that the amount of aircraft they noticed was more than they expected; by contrast just over a third of those surveyed in the Fox Glacier Valley (34.1%, n=263) encountered more aircraft than they expected. Conversely, more Fox Glacier Valley respondents reported that aircraft activity was either less than they expected (6.7%, n=52 Fox Glacier; 2.6%, n=20 Franz Josef) or about the same as they expected (32.6%, n=251 Fox Glacier; 29.3%, n=225 Franz Josef). The percentage reporting that they didn't know what to expect was similar in both valleys (Figure 13).

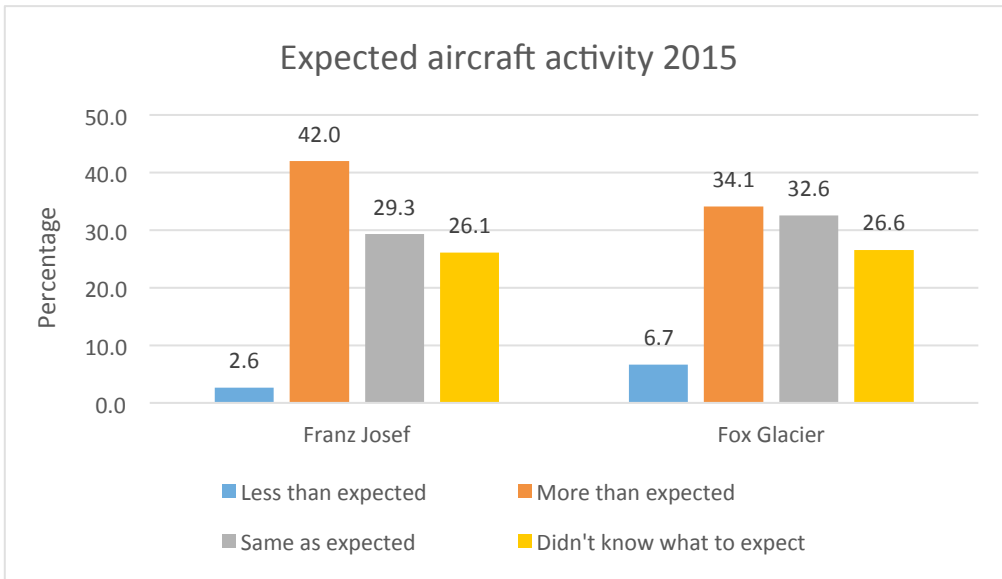


Figure 13 Expected aircraft activity by valley

Figure 14 compares the responses to this question in the Franz Josef Valley in 2013, 2014 and 2015. These data show that since 2013 there has been a decrease in the proportion of those reporting 'more aircraft activity than expected' and 'less aircraft activity than expected', and an increase in those reporting the 'same number of aircraft as expected'. In 2015, the percentage reporting that they did not know what to expect is similar to 2013. These findings are suggestive of more accurate expectations among current visitors to Franz Josef about levels of aircraft activity, a change possibly attributable to the effects of the signs alerting people to the high aircraft activity in the valley.

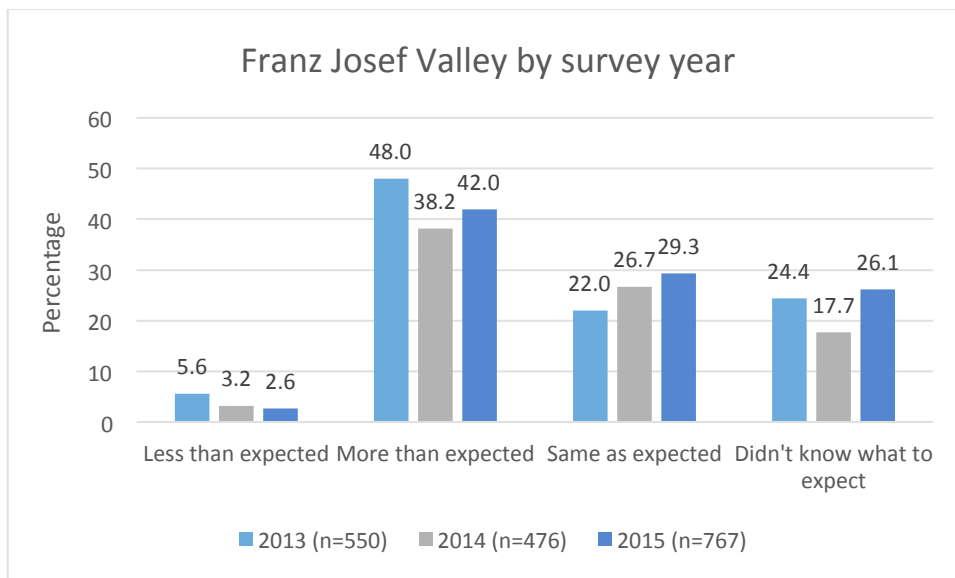


Figure 14 Franz Josef Valley – expected aircraft activity by survey year

Compared with 2013, when the aircraft survey was last undertaken in the Fox Glacier Valley, there has been an increase in the percentage reporting 'more aircraft activity than expected' and a corresponding decrease in the percentage reporting 'less aircraft activity than expected' (Figure 15).

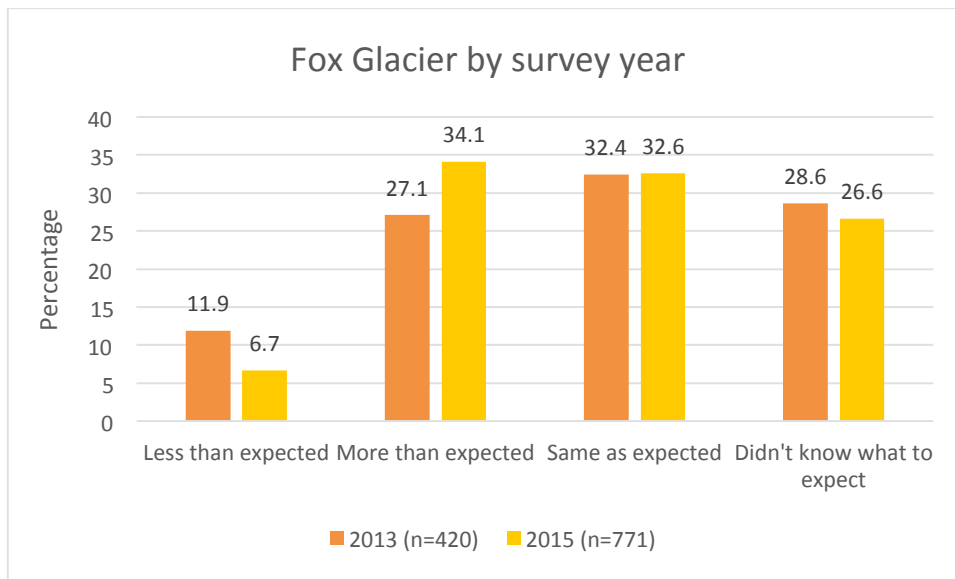


Figure 15 Fox Glacier Valley – expected aircraft activity by survey year

In further analysis (not shown) it was revealed that 71 per cent of Franz Josef Valley visitors who nominated aircraft as a dislike in Question 2, also reported the level of aircraft activity as ‘more than expected’. Just 17 per cent of respondents who ‘disliked’ aircraft in Question 2 reported aircraft activity levels to be the same or less than expected and 12 per cent did not know what to expect.

For those surveyed in the Fox Glacier Valley, 83 per cent of those who nominated aircraft as a dislike in Question 2 also reported the level of aircraft activity as ‘more than expected’. Just 4 per cent of respondents who ‘disliked’ aircraft in Question 2 reported aircraft activity levels to be the same as expected with the remainder reporting that they did not know what to expect. Hence, the importance of maintaining accurate visitor expectations is further emphasised.

When examined by country of residence, the data show that in the Franz Josef Valley international visitors were slightly more likely to report more aircraft than expected (43% compared with 37% of New Zealand visitors) and, conversely, more likely to report fewer (international visitors 2%, New Zealand visitors 5%) or the same number (international visitors 28%, New Zealand visitors 34%) of aircraft as expected.

In the Fox Glacier Valley, 41% of New Zealand visitors reported that the amount of aircraft activity was the same as they expected (compared with only 30% of international visitors). However, international visitors were more likely than New Zealand visitors to report fewer aircraft than expected (7% and 5% respectively); more aircraft than expected (35% and 32% respectively); and not knowing what to expect (28% and 23% respectively).

## Amount of aircraft activity that would spoil a visit

Question 6 - What amount of aircraft activity would spoil your visit to *Tai Poutini* National Park?

In 2015 a filter question was added to Question 6 (Q6A) which asked if there was an amount of aircraft activity that would spoil a visit; 46 per cent ( $n=353$ ) of those surveyed at Franz Josef and 48.5% ( $n=374$ ) at Fox Glacier indicated that there was an amount of aircraft activity that would spoil their visit.

The addition of this filter question makes it difficult to compare the 2015 results with those from previous years. In 2015, only those respondents who indicated that aircraft activity would spoil their visit (i.e., answered yes to the filter question) were asked to identify what amount of aircraft activity would spoil their visit (Figure 16).

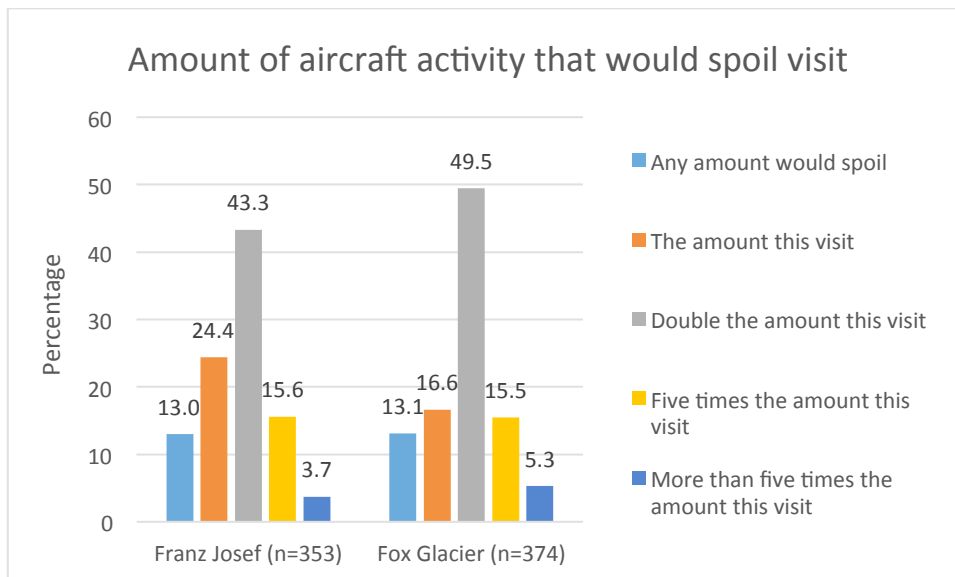


Figure 16 Amount of aircraft that would spoil visit

In both glacier valleys, almost half of those answering this question reported that double the amount of aircraft they had noticed on this visit would spoil their visit; those whose visit would be spoiled in Fox Glacier Valley were slightly more likely to report this (49.5%,  $n=185$ ). At Franz Josef almost a quarter (24.4%,  $n=86$ ) indicated that the amount of aircraft encountered during their current visit would spoil their visit (Figure 16).

## Effect of aircraft on current visit

### Question 7 - How have the aircraft affected you during [this visit](#)?

In 2015, the majority (63.4%,  $n=486$ ) of respondents surveyed in the Franz Josef Valley reported being 'neutral' about aircraft activity, slightly under one quarter (24.5%,  $n=188$ ) reported being 'annoyed' by aircraft and just under nine per cent ( $n=67$ ) 'enjoyed' the presence of aircraft in the valley (Figure 17). This annoyance level is fractionally below the current 25% annoyance threshold proposed by Booth *et al* (1997), and the provisional standard documented in the Social Monitoring SOP (DOC, 2006). The 2015 annoyance level is slightly lower than that reported in the Franz Josef Valley in 2014. As Figure 17 shows, the changes in aircraft effects in the Franz Josef Valley between the 2013, 2014 and 2015 surveys is minimal.

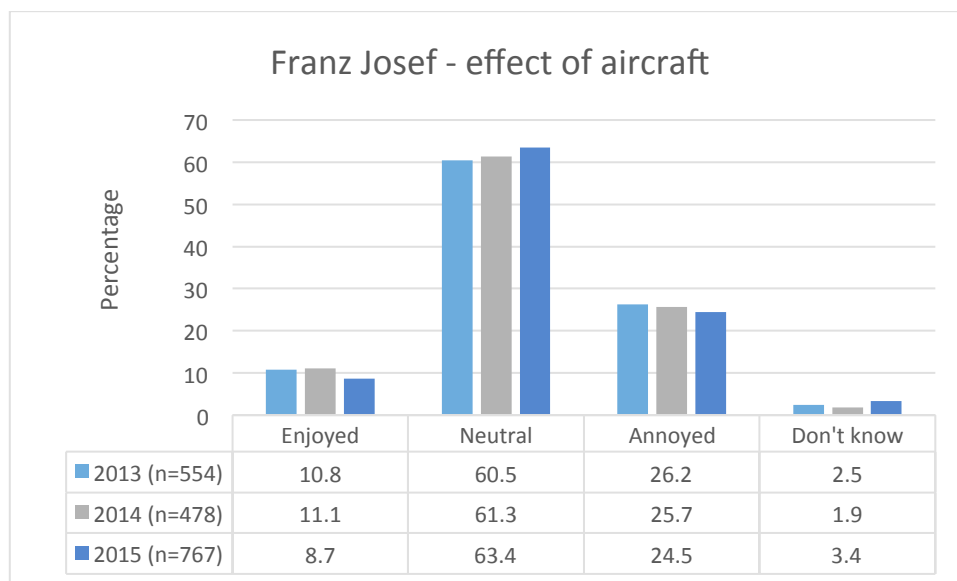


Figure 17 Franz Josef Valley – effect of aircraft by survey year

More than a third (37.8%) of those surveyed in the Franz Josef Valley who were annoyed by aircraft registered 'aircraft' as a 'disliked' aspect of their visit in Question 2.

In 2015, two thirds (64.5%,  $n=497$ ) of those surveyed in the Fox Glacier Valley reported being neutral with respect to the aircraft experienced during their visit; this was similar to the 2013 results (Figure 18). When compared to 2013, however, a smaller percentage reported enjoying aircraft (10.9%,  $n=84$ ) and a larger percentage reported being annoyed by aircraft (22.2%,  $n=171$ ).

The 2013 surveys in the Fox Glacier Valley were undertaken when foot access to the glacier was possible (and there were fewer aircraft overflights). The 16.8% annoyance level (Figure 18) reported that year is similar to that reported in 2009 in the Franz Josef Valley (the last year in which surveys were undertaken when foot access to the Franz Josef Glacier was still possible).

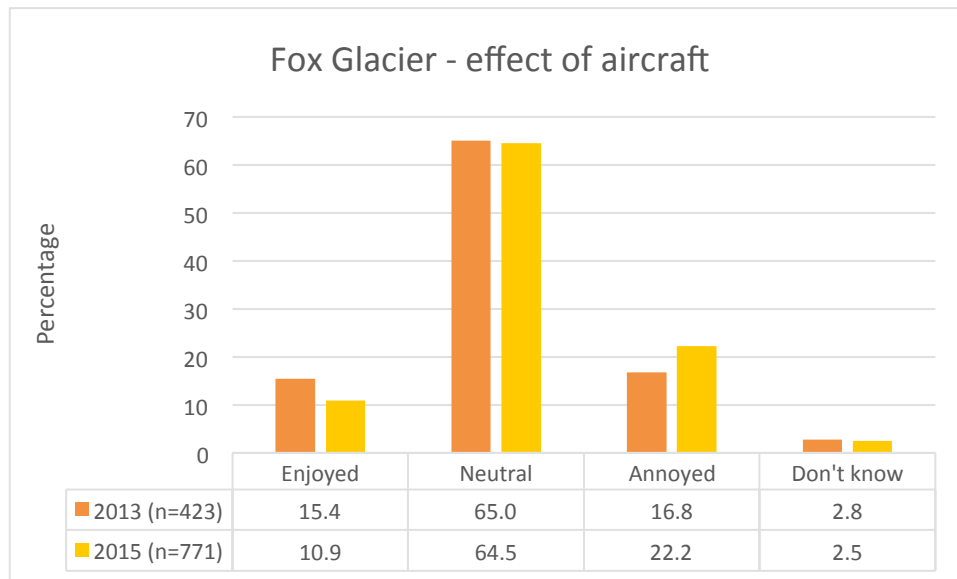


Figure 18 Fox Glacier Valley – effect of aircraft by survey year

Just under a third (26.3%) of those surveyed in the Fox Glacier Valley who were annoyed by aircraft registered ‘aircraft’ as a ‘disliked’ aspect of their visit in Question 2.

Additional analysis by country of residence indicates that in both valleys international visitors were more likely than New Zealand visitors to be annoyed by aircraft (Table 18). In 2014, 27.3% of international visitors in the Franz Josef Valley reported annoyance compared with 19.1% of New Zealand visitors.

The 2015 data shows that New Zealand visitors were slightly more likely to enjoy or be neutral about aircraft in both valleys. In the Fox Glacier Valley there were greater differences between New Zealand and international visitors in respect of these aircraft impacts (Table 18).

Table 18 Impact of aircraft by country of residence and valley

Impact of aircraft	Franz Josef (%)		Fox Glacier (%)	
	International	New Zealand	International	New Zealand
Enjoyed aircraft	8.1	10.8	10.8	11.0
Neutral about aircraft	62.8	65.1	62.5	70.0
<b>Annoyed by aircraft</b>	<b>25.3</b>	<b>21.7</b>	<b>24.0</b>	<b>17.0</b>
Don't know	3.7	2.3	2.6	2.0

In both valleys, the relationship between those reporting ‘annoyance’ with aircraft and flight levels experienced is ambiguous (Table 19), with no clear pattern evident.

Table 19 Percentage reporting annoyance by flight activity level and valley

Flight activity level	Franz Josef (%)	Fox Glacier (%)
Medium	26.1	17.1
High	20.7	25.3
Very High	25.3	22.0

## Measure of aircraft annoyance

Question 8 - How much have the aircraft annoyed you? (1-7 scale)

Question 8 was answered only by those respondents who stated that they were annoyed by aircraft in Q7 (Franz Josef  $n=188$ ; Fox Glacier  $n=171$ ). The results are presented below by valley.

In the Franz Josef Valley, on the seven-point scale (where 1= 'hardly annoyed at all' through to 7 = 'extremely annoyed'), the most common response in 2015 was a 5 (42.6% of those who were annoyed). In 2015 the mean annoyance score was 4.66; this compares with mean annoyance scores of 4.52 (in 2014) and 4.94 (in 2013) (Figure 19).

When examined by survey year, these data show a shift in the distribution with fewer respondents reporting the annoyance levels of 6 and 7 than previously. Although the mean annoyance level shows a slight increase, there is also evidence that those visitors annoyed by aircraft express this perception less strongly than was evident in previous years. In 2013, over one third (34.5%) of those who reported being 'annoyed' by aircraft at Franz Josef expressed this at the most extreme end of the scale (represented as points 6 and 7 on the scale). In 2015, 19.1 per cent of the responses fall into this category (Figure 19).

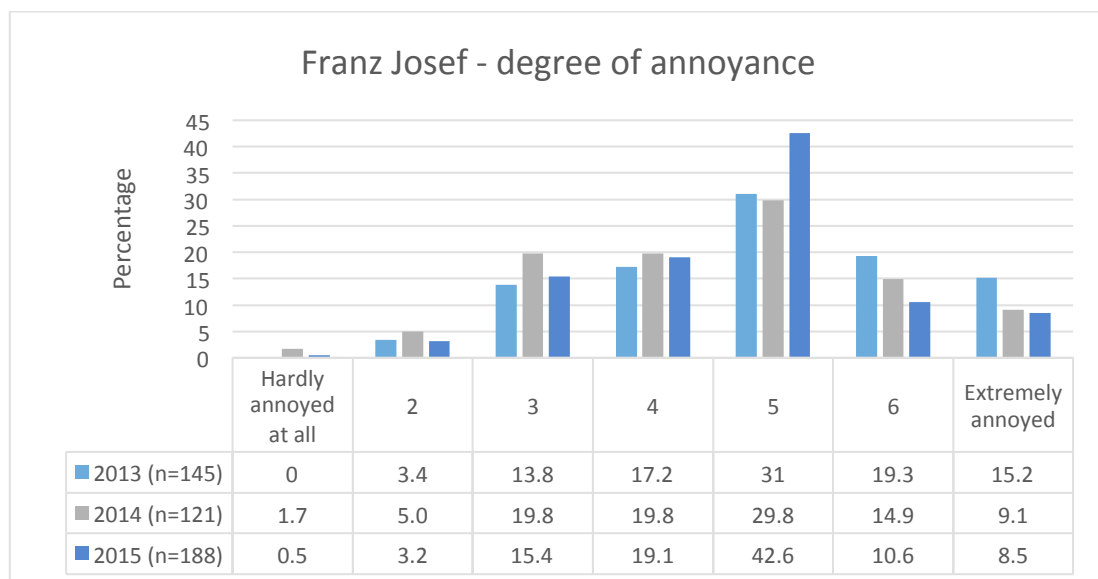


Figure 19 Franz Josef – degree of annoyance with aircraft by survey year

As Figure 20 shows, the most common annoyance level reported in the Fox Glacier Valley was also a 5 (reported by 38% of respondents who were annoyed). When compared with 2013, the percentage reporting an annoyance level of 5 has increased while the percentage reporting the highest levels of annoyance (i.e., 6 and 7) has decreased (a similar pattern to the Franz Josef Valley). In the Fox Glacier Valley in 2015 the mean annoyance score in was 4.44, slightly lower than the 2013 mean score of 4.54.



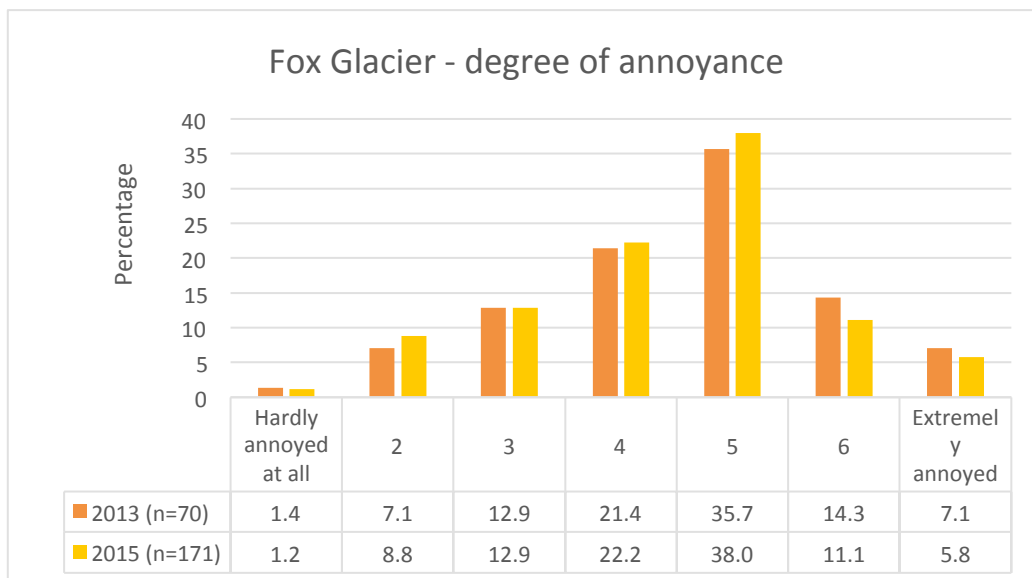


Figure 20 Fox Glacier – degree of annoyance with aircraft by survey year

Table 20 shows the mean annoyance scores in each valley by flight activity levels.

Table 20 Mean annoyance scores by flight activity level and valley

Flight activity level	Franz Josef	Fox Glacier
Medium	5.25	4.06
High	4.43	4.35
Very High	4.66	4.55

There appears to be a slight anomaly with respect to a cohort of 12 respondents surveyed in the Franz Josef Valley. This has contributed to both a higher percentage of annoyance reported (26.1%, Table 19) and a higher mean score for annoyance (5.25) than might otherwise be expected during medium flight activity levels. However, closer analysis of these 12 respondents did not identify any particular demographic or visit characteristics (i.e., they represented a variety of age and visitor groups, had equal gender distribution and were from a number of countries). Only 5 of the 12 recorded aircraft as a ‘dislike’ in Question 2, although 9 of the 12 reported encountering more aircraft than expected, and 11 indicated that aircraft would spoil their visit (3 reporting that any aircraft would spoil it and 6 that the amount on this visit would spoil it).

### Measure of aircraft impact on visit enjoyment

Question 9 - How much have the aircraft detracted from your total enjoyment of [this visit](#) to Westland *Tai Poutini* National Park? (1-7 scale)

Question 9 was answered only by those respondents who stated that they were annoyed by aircraft in Q7 (Franz Josef  $n=188$ ; Fox Glacier  $n=171$ ). The results are presented below by valley.

The mean score in the Franz Josef Valley in 2015 was 3.85 (compared to 3.76 in 2014 and 4.06 in 2013). In 2013, 13.1 per cent of those annoyed by aircraft rated the degree to which aircraft had detracted from their total enjoyment as 6 or 7 (where 7 = 'ruined my visit') (Figure 21). In 2015, these two scale points represented 6.9 per cent of respondents to this question. In combination with the results of Questions 7 and 8 (above), this finding is indicative of a modest decrease in the negative effects of aircraft activity on visitors to Franz Josef between 2013 and 2015.

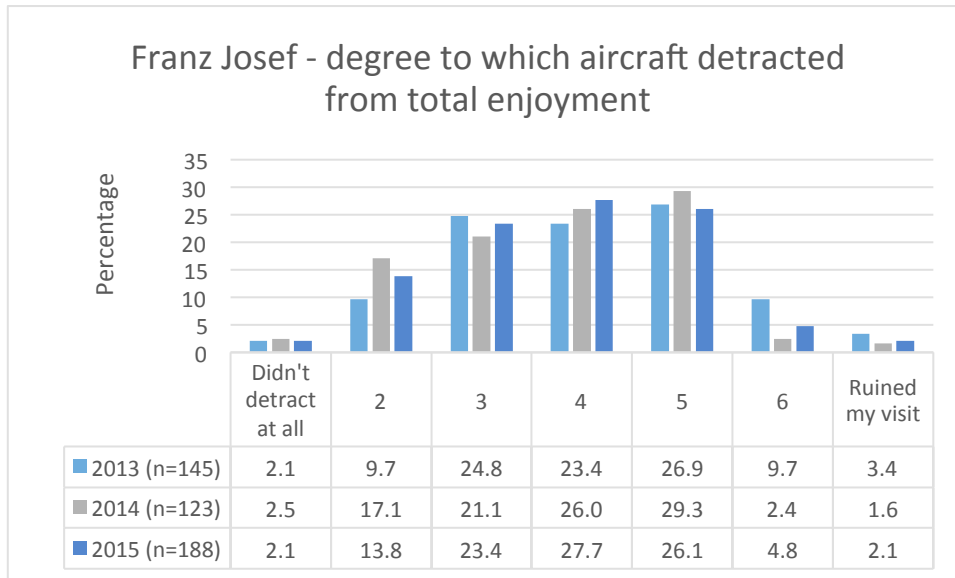


Figure 21 Franz Josef Valley – degree to which aircraft detracted from total enjoyment

The mean score in the Fox Glacier Valley in 2015 was 3.78, showing little change since 2013 (3.71). As Figure 22 shows, the percentage of respondents in the Fox Glacier Valley reporting detraction scores of 6 or 7 was slightly lower than in 2013.

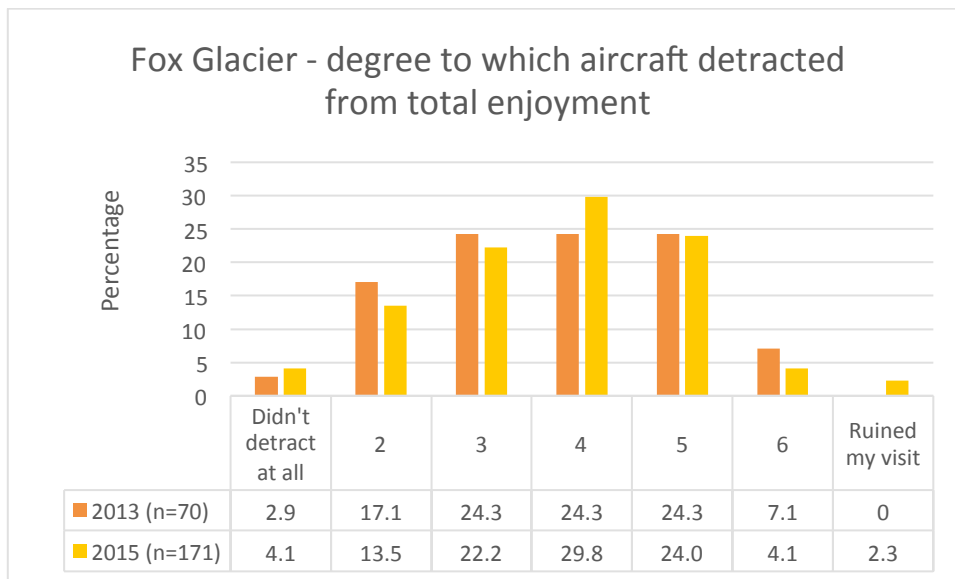


Figure 22 Fox Glacier Valley – degree to which aircraft detracted from total enjoyment

These figures are collapsed into three categories in Figure 23 (Franz Josef Glacier) and Figure 24 (Fox Glacier), whereby a score of '4' is taken as aircraft having a neutral impact on total enjoyment, and the scores on either side represent either 'no impact' (i.e., scores of 1, 2 and 3) or a 'negative impact' on total enjoyment (scores of 5, 6 and 7).

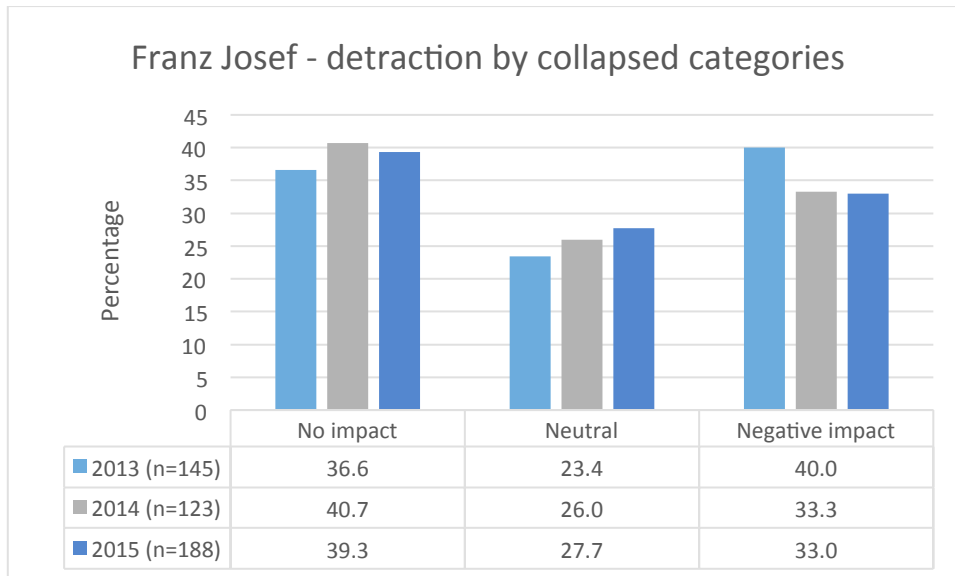


Figure 23 Franz Josef – detraction from total enjoyment, collapsed categories

At Franz Josef, the percentage reporting no impact remained roughly similar over the three survey years, while the percentage recording a neutral impact has increased each year and the percentage reporting a negative impact fell between 2013 and 2014 before stabilising in 2015.

At Fox Glacier only one year is available for comparison, but shows that the percentage reporting no impact and negative impacts has fallen while the percentage recording a neutral impact has increased.

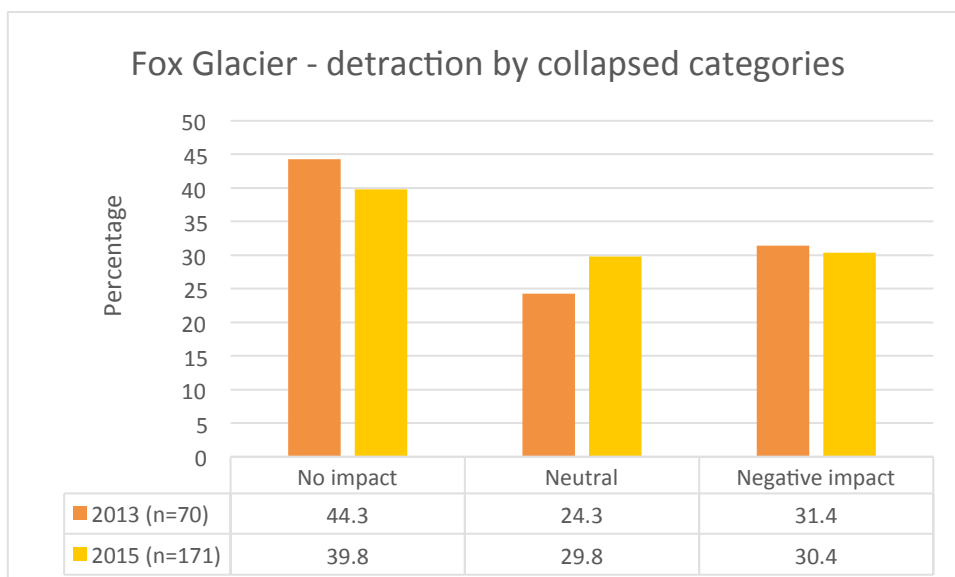


Figure 24 Fox Glacier – detraction from total enjoyment, collapsed categories

Table 21 shows the mean ‘detraction from total enjoyment’ scores in each valley, by flight activity levels. Once again, these scores show some ambiguity in the Franz Josef Valley survey results (i.e., there is a higher mean detraction score for those surveyed during medium flight activity). This ambiguity can probably be attributed to the relatively small number of surveys completed in the ‘medium’ flight activity level and the consequential influence of very high ‘detraction from enjoyment’ scores selected by these respondents.

*Table 21 Mean detraction from enjoyment scores by flight activity level and valley*

<b>Flight activity level</b>	<b>Franz Josef</b>	<b>Fox Glacier</b>
Medium	4.67	3.06
High	3.64	3.82
Very High	3.82	3.88

## Conclusion

On the whole, the results of the 2015 monitor show considerable consistency with the findings from previous iterations – especially those of 2013 and 2014. The central deviation from this conclusion is the finding that visitor annoyance levels at Fox Glacier have increased substantially - a finding not unexpected given the increased flight activity at this site since the most recent aircraft monitoring was undertaken. It is also apparent that, despite similar numbers of aircraft movements, visitors at Fox Glacier may be more tolerant of aircraft activity compared with their Franz Josef counterparts, with fewer aircraft noticed; fewer people reporting aircraft as a ‘least liked’ aspect; fewer people reporting more aircraft than expected; fewer people reporting annoyance; and lower mean scores for annoyance and detraction. The reasons for this are largely unexplored but might relate to situational effects such as how visible or audible aircraft are; flight-path options; and/or the differences in physical character of the valleys which influence how aircraft noise is perceived.

At Franz Josef, the effects of aircraft activity on the visitor experience appear to have moderated slightly between 2013 and 2015. Although the proportion of visitors reporting ‘annoyance’ with aircraft has remained more or less constant at this site, there appears to have been a decrease in other indicators including the number of visitors reporting aircraft as a ‘least liked’ aspect (unprompted), the degree to which annoyance is expressed, and the extent to which aircraft have detracted from the total visitor experience.

The data suggest a plateau in visitor annoyance levels might have been reached at Franz Josef Glacier, with the results from Question 7 hovering at or around the 25 per cent threshold since 2013. It is likely that concerted effort by management to create accurate visitor expectations has helped ensure that annoyance levels have not crept up beyond this. It is also possible that media interest in the physical and general environmental conditions at the Glaciers (including aircraft noise - especially Franz Josef) has provided New Zealand visitors with a better basis for forming perceptions about future experiences at the glaciers. While this monitor does not explore details of how expectations are formed, the data from the 2015 survey does indicate some interesting differences between domestic and international respondents in terms of expected levels of aircraft activity and annoyance levels, and continues to demonstrate the role expectations play in shaping visitors’ on-site experiences.

Future monitoring of the effects of aircraft overflights on visitors to the glaciers should retain the modification to Question 6 adopted for 2015. This is both more straight-forward for respondents to answer and provides a more accurate assessment of perception. Future iterations of the monitor (at the glaciers or elsewhere) should also consider ways to collect data from those visitors who have difficulty comprehending English. In particular, with the anticipated increase in visitors from China, this important visitor segment should be more fully incorporated into future analyses.

## References

Booth, K. L., Jones, N. C. & Devlin, P. J. (1997). The effects of aircraft overflights on recreationists in natural settings. Report prepared for Science and Research, Department of Conservation.

Booth, K. L., Jones, N. C. & Devlin, P. J. (1999). Measuring the effects of aircraft overflights on recreationists in natural settings. Department of Conservation Technical Series 18.

Espiner, S.R., & Wilson, J. (2013). Monitoring the effects of aircraft over-flights on visitors to the Glaciers, Westland *Tai Poutini* National Park, New Zealand: A report presenting results from the 2013 visitor survey. Report prepared by Espiner Consulting for the West Coast Conservancy, Department of Conservation, New Zealand.

Espiner, S.R., & Wilson, J. (2014). Monitoring the effects of aircraft over-flights on visitors to the Glaciers, Westland *Tai Poutini* National Park, New Zealand: A report presenting results from the 2013 visitor survey. Report prepared by Espiner Consulting for the Department of Conservation, North and Western South Island Region, New Zealand.

Department of Conservation (2006). Visitor monitoring toolkit: Social monitoring Standard Operating Procedure (DOCDM 33609). Department of Conservation, Wellington.

Operating Procedure (DOCDM 33609). Department of Conservation, Wellington  
Department of Conservation (2012). Partial Review - Factsheet DOCDM-1037747.

## Appendices

### Appendix 1: 2015 Visitor Survey

<i>Office use only</i>
<i>Code:</i>
<i>Date:</i>



Department of Conservation  
*Te Papa Atawhai*

#### VISITOR SURVEY

Thank you for your time. These questions ask about your visit to Westland *Tai Poutini* National Park. Please think about your current visit on this walk when answering all questions.

- 1**      **What have you liked the most about your visit to Westland *Tai Poutini* National Park?**

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- 2**      **What have you liked the least about your visit to Westland *Tai Poutini* National Park?**

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3 **Have you noticed any aircraft during this visit?** By aircraft we mean both helicopters and/or aeroplanes.

Yes ↑ Aeroplanes  
↑ Helicopters

No ↑

If you answered NO to question 3, please go to Question 10.

If you answered YES to question 3, please go to Question 4.

4 **What number of aircraft have you noticed on this visit?**

Count each aircraft fly-over separately even if it was the same craft.

\_\_\_\_\_

5 **Has the amount of aircraft activity you've noticed on this visit been:**

1 **Less** than what you expected on this visit ↑

2 **More** than you expected ↑

3 About **the same** as you expected↑

4 You didn't know what to expect↑



**6 A Is there an amount of aircraft activity that would spoil your visit to Westland Tai Poutini National Park?**

<sub>1</sub> Yes (please go to Question 6B)

<sub>2</sub> No (please go to Question 7)

**6B If you answered Yes in Question 6A, what amount of aircraft activity would spoil your visit?**

Please tick only one box.

1 Any aircraft activity at all would spoil my visit

2 The amount I've noticed this visit  
(my visit has been spoiled) ↑

3 Double the amount I've noticed this visit ↑

4 Five times the amount I've noticed this visit ↑

5 More than five times the amount I've noticed this visit ↑



**9 How much have the aircraft detracted from your total enjoyment of this visit to Westland *Tai Poutini* National Park? Please circle the number that best describes your answer.**

1      2      3      4      5      6      7

Didn't detract  
at all

Ruined my visit

**10 Please tell us a little about yourself:**

**Age** (tick  ONE only):

<sub>1</sub> < 20 yrs

<sub>2</sub> 20-29

<sub>3</sub> 30-39

<sub>4</sub> 40-49

<sub>5</sub> 50-59

<sub>6</sub> 60+yrs

**Gender:**       <sub>1</sub> Male

<sub>2</sub> Female

**Where do you normally live?:**

New Zealand

<sub>1</sub>

USA

<sub>5</sub>

Australia

<sub>2</sub>

Other (specify)

<sub>6</sub>

UK

<sub>3</sub>

\_\_\_\_\_

Germany

<sub>4</sub>

**How many people are in your group?:** \_\_\_\_\_

***Thank you for your time!***

This survey has been funded by the *Westland Tai Poutini National Park Aircraft User Group* and glacier guiding companies to help understand the effects of aircraft activity on park users

## Appendix 2: Weather conditions, number of flights (take-offs) & survey numbers

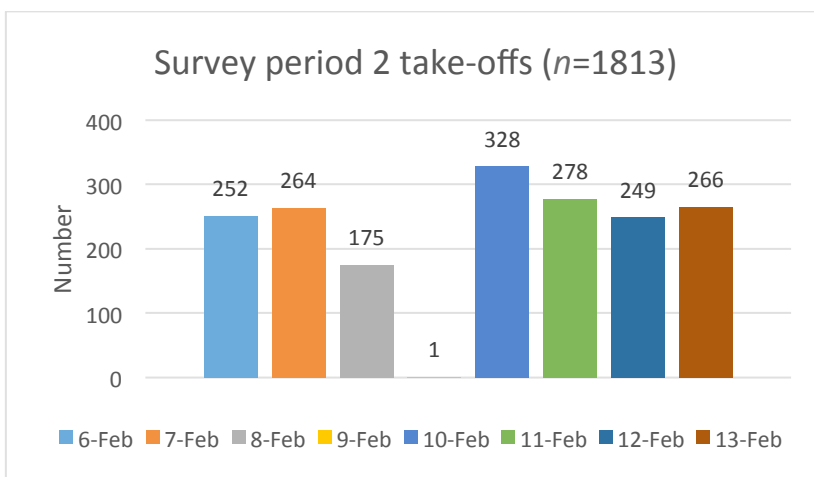
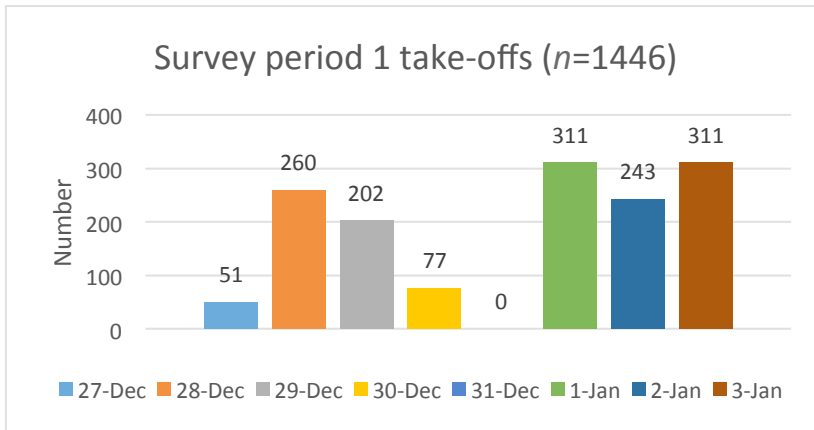
<b>Date</b>	<b>Weather conditions</b>	<b># Flights</b>	<b># Surveys</b>
27-Dec	Cloudy overall, heavy rain late afternoon, Fox Glacier weather better than Franz Josef	51	-
28-Dec	Clear at Franz Josef, drizzle at Fox Glacier village in morning, fine up Fox Glacier Valley	260	274
29-Dec	Foggy/drizzle in morning, good afternoon but some rain showers	202	165
30-Dec	Foggy/drizzle in morning, stayed cloudy and wet all day	77	-
31-Dec	Heavy rain in morning, some clear spells in afternoon (valley tracks partially closed)	-	-
1-Jan	Beautiful day, some afternoon cloud	311	161
2-Jan	Fine morning, some afternoon cloud	234	136
3-Jan	Fine, hot day	311	61
6-Feb	Clear morning, high cloud in afternoon at Fox Glacier, some rain at Franz Josef in afternoon	252	246
7-Feb	Clear morning, some afternoon cloud, warmer than previous day	264	190
8-Feb	Overcast with low cloud at Franz Josef, sunny up high	175	30
9-Feb	Heavy rain periods in morning, cleared in afternoon	1	-
10-Feb	Beautiful day	328	153
11-Feb	Beautiful day	278	127
12-Feb	Beautiful day, fog at Franz Josef until lunchtime	249	27
13-Feb	Beautiful day	266	30

## Appendix 3: Flight record sheet

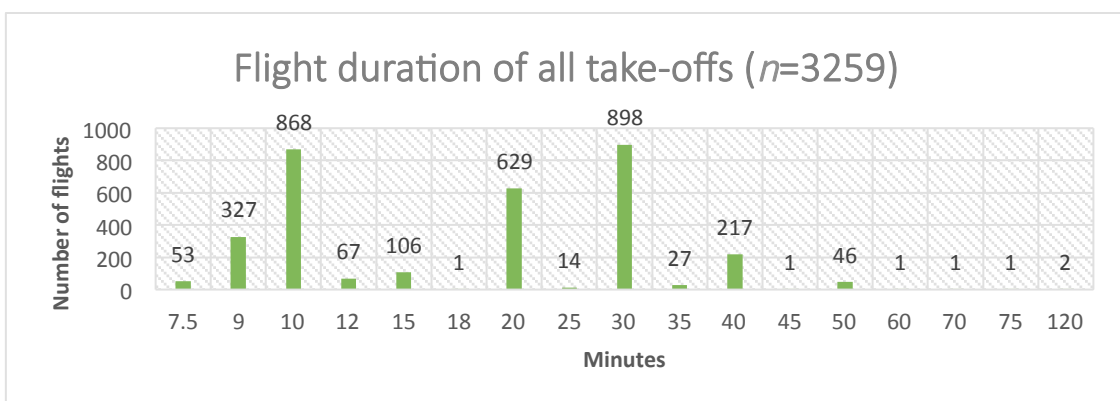


## Appendix 4: Flight details

The 2015 flight data (for take-offs) is reported in more detail below. While there were the same number of days with flights in both survey periods, the better weather experienced February resulted in 367 more flights during that time. The second survey period also experienced the busiest single day of flights ( $n=328$  on February 10) although there were two days with over 300 flights during the first survey period. In previous years the most flights in any one day (during surveying) was 240 (in 2013) and 231 (in 2014).

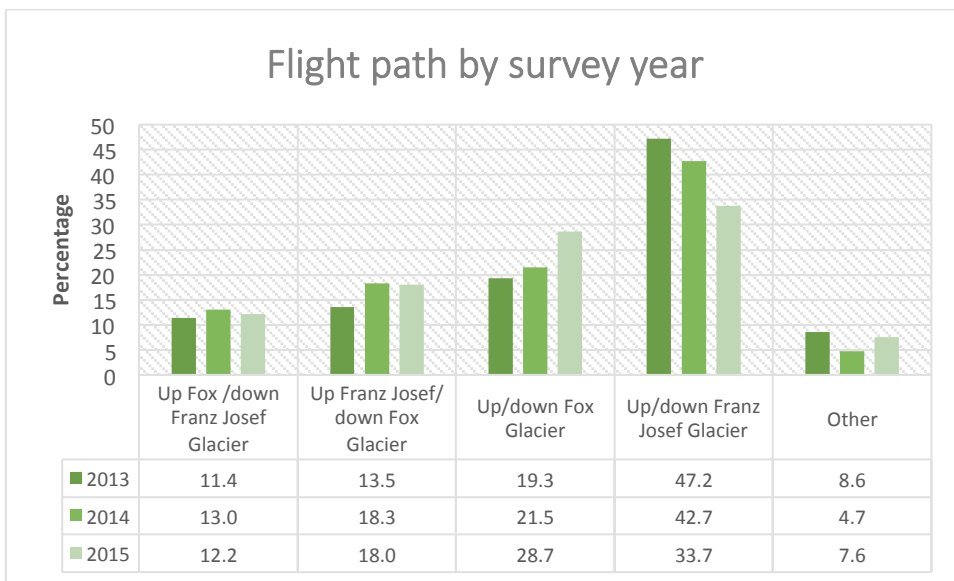
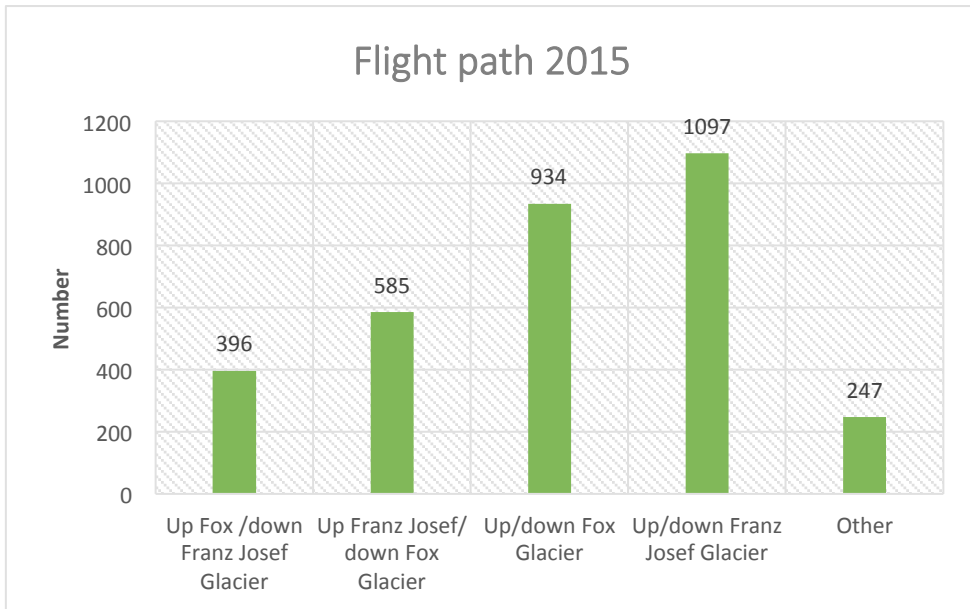


In 2015, there was more variation in flight duration than reported in previous years as a result of the increased number of heli-hike flights at Fox Glacier. Altogether, flights of 10 minutes (26.6%), 20 minutes (19.3%) and 30 minutes (27.6%) accounted for 73.5% of all flights.



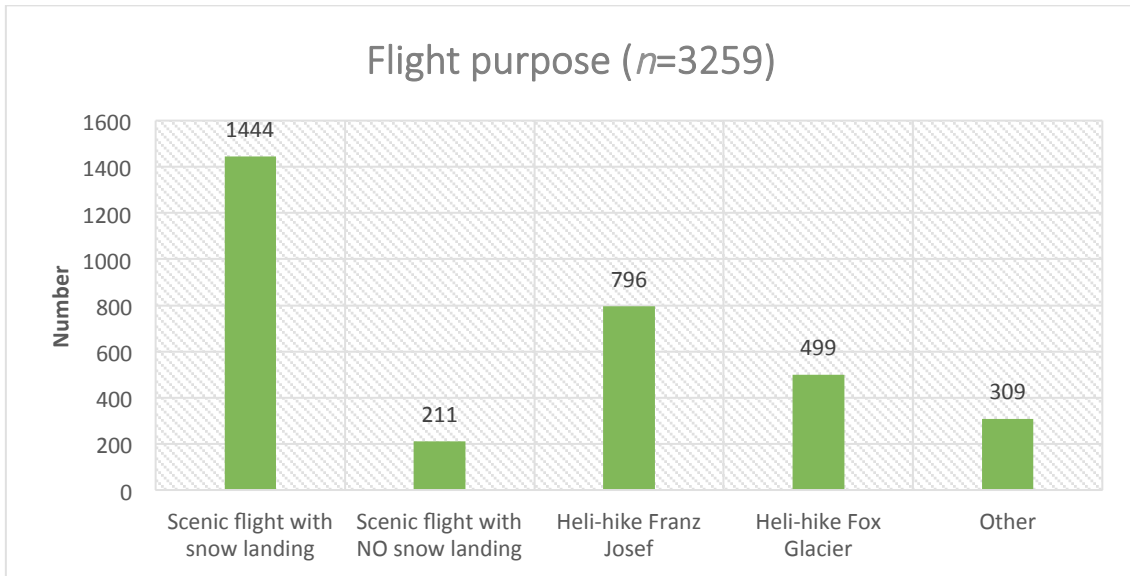


The most common flight path in 2015 was up/down the Franz Josef Valley although these only accounted for 33.7% of all flights (compared to 47.2% in 2013 and 42.4% in 2014). In 2015, the biggest change in flight path (compared with previous two years) was up/down Fox Glacier, again reflecting the change in glacier access for the hiking company. The majority of the 247 'other' flight path flights were sky dive flights ( $n=226$ ) which did not cross the glacier valleys. While some of the 21 'other' flights may have crossed one or other of the glacier valleys, poor and inconsistent reporting necessitated their exclusion from the over-flight calculations.



The changes in flight activity at Fox Glacier in 2015 meant that the flight purpose categories used in 2013 (and in 2014 for the Franz Josef Valley survey) were no longer applicable and new categories were added to the flight record sheet (see Appendix 3). However, while data was recorded for 7 flight path categories these proved to be inaccurate in respect of landing heights. The graph below presents combined data recorded at Franz Josef Glacier as heli-hikes and Ice Explorer (i.e., now simply 'Franz Josef heli-hike') as these now land in virtually the same place on the glacier and follow similar flight paths (in previous years there was a greater

distinction between landing sites for these two products). Likewise, at Fox Glacier there was no difference in the flight and landing heights for heli-hikes and Flying Fox trips (now 'Fox Glacier heli-hike'). Flight data shows that scenic flights with snow landing still represent the most common 'flight purpose' (44.3% in 2015 compared with 44.2% in 2013 and 44.5% in 2014). In 2015, almost a quarter of all flights were for Franz Josef heli-hikes (24.4%) and 15.3% were for Fox Glacier heli-hikes (15.3%).



Almost three quarters (73%,  $n=226$ ) of the 309 'other' flight purposes reported were sky dive flights, which do not fly in the glacier valleys. The remainder ( $n=83$ ) were service flights (taking guides, equipment and DOC staff to a variety of locations) and chartered flights taking climbers into the mountains. A small number were chartered scenic flights to locations other than the glacier valleys.

## Appendix 5: Full list of countries of residence 2015 sample

	Country of residence	Number of respondents (n=1600)
<b>Australasia &amp; Oceania</b>	New Zealand	382
	Australia	216
	New Caledonia	2
	Tahiti	1
<b>Europe</b>	UK	224
	Germany	212
	France	71
	Netherlands	50
	Switzerland	34
	Denmark	24
	Spain	20
	Belgium	19
	Czech Republic	19
	Sweden	18
	Ireland	12
	Austria	12
	Finland	9
	Poland	6
	Norway	3
	Russia	2
	Estonia	2
	Latvia	1
	Hungary	1
	Italy	1
<b>Americas</b>	USA	116
	Canada	43
	Brazil	6
	Columbia	6
	Mexico	4
	Chile	3
	Argentina	2
	Uruguay	1
<b>Asia</b>	Singapore	20
	India	9
	China	9
	Japan	5
	Korea	3
	Indonesia	3
	Hong Kong	3
	Thailand	2
	Taiwan	1
	Malaysia	1
	Philippines	1
	<b>Middle East &amp; Africa</b>	Israel
South Africa		3
Oman		1
<b>Unspecified</b>		2