Monitoring and Management of Visitor Flows in Recreational and Protected Areas
Conference Proceedings ed by A. Arnberger, C. Brandenburg, A. Muhar 2002, pages 53-58

Monitoring Low Volume Walker Use of a Remote Mountain Range: a Case Study of the Arthur Range, Tasmania, Australia

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Abstract: Registration data are the major source of information about bushwalker (hiker, tramper, rambler) volumes and basic characteristics in the Arthur Range within the Tasmanian Wilderness World Heritage Area. This paper describes the problems encountered with the existing registration system and the simple and practical solutions adopted to address them.

INTRODUCTION

Twenty per cent of the land area of the Australian state of Tasmania is listed as World Heritage Area (WHA) and is managed by the Parks and Wildlife Service. This is a rugged, glacially-formed mountainous region of exceptional natural beauty. Along with some regions of New Zealand and South America, it used to be part of the ancient supercontinent of Gondwanaland. The three areas are linked in their geology, flora, fauna and weather—wet, windy and westerly.

Figure 1.The location of the Arthur Range within the Tasmanian Wilderness World Heritage Area..

Within the WHA lies the Arthur Range, renowned amongst Australian bushwalkers (hikers, trampers, ramblers) for its walking opportunities and weather, both of which are unparalleled in the country. Federation Peak (1224m), the highest peak in the range, was first climbed by Europeans in 1949, and a visit to this peak is still considered a rite of passage for many serious bushwalkers. Road access was first extended to within 10km of the Range in the 1960s and currently the entire range receives fewer than 1000 walkers each year.

Apart from an entry fee that is only collected at large, well-staffed sites, there is no walker regulation in Tasmania. Registration books have always been the major source of information about overnight track use in the WHA being an inexpensive information-gathering tool for a track network most of which is remote, low use (by European or North American standards) and infrequently visited by Service staff. Registers are located at all track heads to the Arthurs, and on the summit of Federation Peak itself.

During the late '80s, there was some evidence that use of the Arthurs was expanding rapidly. Serious consideration was given towards more restrictive management, such as a quota-based permit system to regulate walker numbers. During the ensuing public consultation, it became obvious that the existing registration data was inadequate. In short, the information was poorly accessible and difficult to interpret as it was plagued with missing data. The accuracy of the data pertaining to intended route was suspect while no reliable information was collected about actual patterns of use. This was a major problem because—and as detailed below—walkers frequently change their plans due to weather and the terrain. Consequently, anecdote was resorted to as a major source of information. This was not acceptable when dealing with the public over access issues: clearly more accurate and reliable information was required.

In 1997 additional resources were allocated to walker monitoring in the range. Some simple, practical and cost-neutral changes were made—and are described in this report—that resulted in a standard of information that both management and the public found acceptable. The revised system is by no means perfect but in the world of modern protected area management perfect systems are usually not practical or affordable. Modern land managers have to make do with what is *acceptable* within resource constraints.

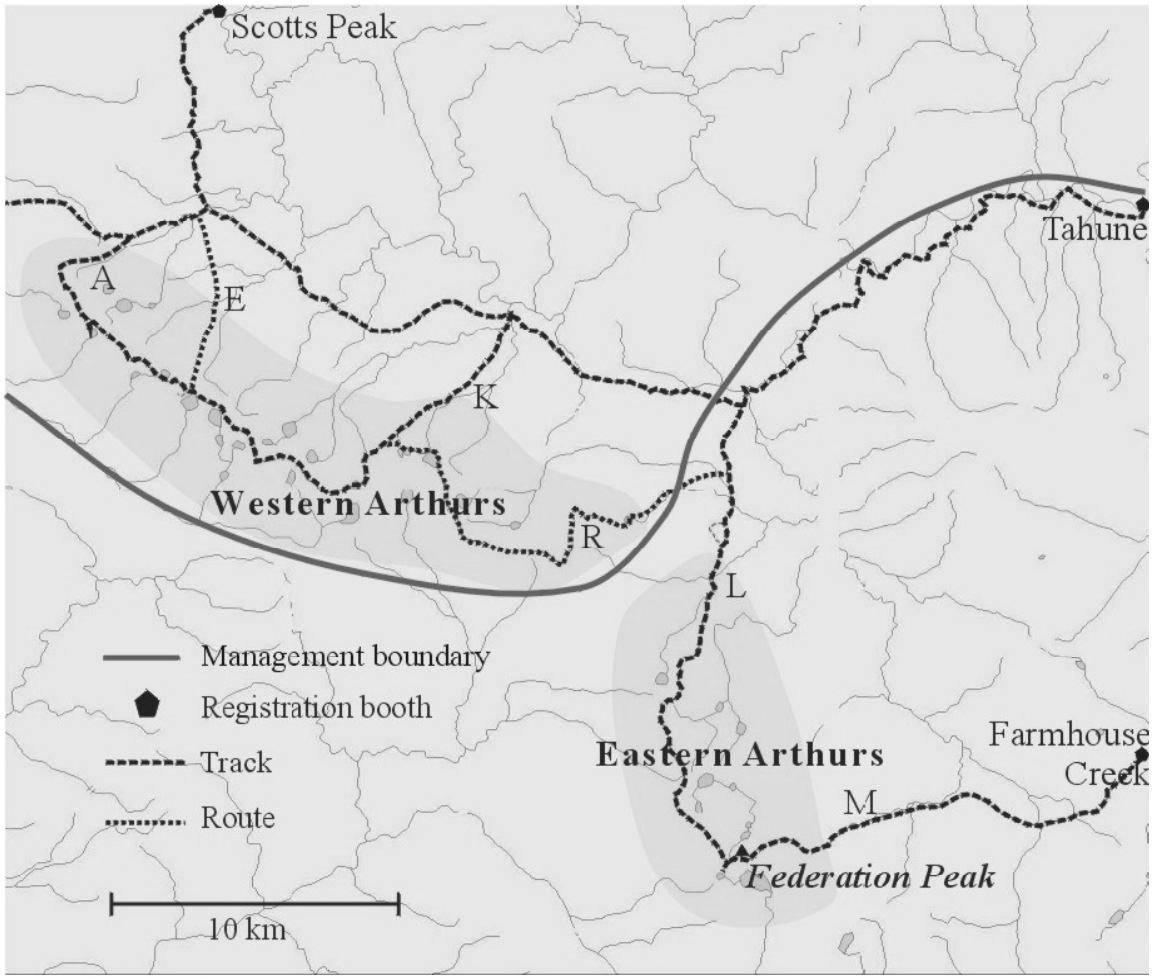

Figure 2. The division of the Arthur Range into Western and Eastern sections, as noted by the shading..

Topography of the range

There are three major track heads servicing the range (Scotts Peak, Farmhouse Creek and Tahune, see figure 2). The range itself is divided into eastern and western sections that are treated as two separate destinations by most bushwalkers. Federation Peak is the major destination in the eastern section, and is accessed by either routes L or M. In the Western Arthurs most walkers follow rough tracks along the skyline amongst the glacial lakes and small rugged peaks that feature on that part of the range. Most walkers access the range via route A, and there are three further escape routes, E, K and R, along the range so a large number of permutations of route are possible. Most tracks are formed, with the exception of routes E and R, which are pads or routes only. Given the ruggedness of the range and the ferocious scrub, walkers stay to tracks and routes so that prediction of movement through the range is straightforward if the access and egress points are known.

PROBLEMS AND SOLUTIONS

As stated in the introduction, there were four problem areas with the available information pertaining to walker use of the Arthurs prior to 1997. These were problems with missing data; lack of knowledge of actual—as opposed to intended—patterns of use; perceived unreliability of existing intention information and poor accessibility of data. These problems were addressed by the simple application of information management tools: through better coordination of field operations, changes in register design, data handling and reporting.

System coordination and administration

A district management boundary bisects the range (figure 2). Both districts had different operational systems and maintenance and collation of registers in the two districts was undertaken independently, even though walkers' routes cross these boundaries at will: many start at a track head in one district and end in the other. One district changed the registers over and collated data every month. The other changed the book over every year and data collation was not undertaken in the district at all.

Frequent field servicing of registers is desirable as this means that missing data due to theft of registers or their running out of pages is minimized. However this must be balanced against the considerable cost of travelling to the register stations. In this example one district was expending

too many resources in servicing registers, while the other district was expending too few. The optimum for the two districts was quarterly servicing.

Prior to 1997, districts manufactured their own registers and this required many hours of tedious photocopying and binding. Districts are now supplied with a stock of registers that are made up in head office, and all they need do now is swap over the register during the quarterly visit. This has freed time for district staff. It has also meant that all registers meet a standard format and standard of quality as office equipment in Head Office is usually a higher standard than in the district. Unused pages from old registers are recycled in new registers.

The major paradigm shift of the entire exercise was the recognition that registers from different track heads should not be treated as independent entities, especially when there are through routes connecting them. Failure to recognise this results in *n*-tuple overestimation of walkers on that through route, where *n* represents the number of registers servicing the route. That the registers should be treated independently was something that simply evolved over the lifetime of the Service, but has now been eliminated from all walker monitoring systems maintained by the Service.

Furthermore, prior to 1997 handling the data from the registers was treated as a clerical chore. Data was entered verbatim from the register to database without any data checking. Obtaining valid information from the register requires that the person working with the data is an experienced walker in the area.

What this meant in effect was that all data handling became a head office task. Optimally, districts should be in control of their own data management systems as they have first priority need for the data. However in order to address the problems described above, it was necessary that the work be done in Head Office. In fact, the districts were happy to relinquish the task so long as information was accessible.

Register design

A standard design was devised in 1992. This required the registrant to sign across a row that spanned two A4 pages. While a vast improvement on the blank-page, journal-style logbook it replaced, the 'new' format was contributing to the problem of missing data. Registrants were breaking rows across the two pages; they overlooked columns and they were frequently confronted with books where the wrong pages were bound next to each other. Changing the format to a single, landscape orientated page (figure 3) resulted in better compliance for all items across the row. The width of the page does limit the amount of information that can be requested, but that means that the management agency has to limit their data requests to only the highest priority information.

Limit information requests to one item per column. Better compliance results when only one item of information is requested per column. In the 1992 format, we asked for party leader's name and address in the first column. After 1997, we asked for party leader's name in the first (for cross matching parties for through routes) and origin in the second. This resulted in an improvement in compliance from a yearly average of 75% (SD 5.9%) of parties in the 5 years preceding the format change, to a yearly average of 98% (SD 1.0%) over the 4 years since the new format was introduced.

Use unambiguous column headings. Use column headings that cannot be misunderstood. For instance, ask for walk start date and finish date rather than 'length of trip in days' which people often interpret as 'number of nights'. Never say that an item is optional, and never include 'if' in a column heading (see below).

Scotts Peak Logbook

For search and rescue purposes, in case you are reported overdue

The route number may be on the map in front of you. If not, describe your route in 'sidetrips/other routes' column

Party Leader's Name	Party Leader's postcode or overseas country of origin	Contact phone no. or car rego	Route No.s	Sidetrips/ other routes	Walk start date	Walk finish date	No. in party	Complete on finish of walk: Where did you start the walk?	Return signature	Date	Where did you actually walk?
for example: Z. Smith	5024	088 9999999	31		1/1/99	5	3	here (name track)	ZS	4/1/99	Lake Oberon return (via Moraine A)

Complete on finish of walk

Figure 3. Revised register format

If you want information, ask for it. As already stated, one of the insurmountable problems with the Arthurs walker data was not knowing what routes were actually walked, as opposed to what was intended. There was no provision within the registers for that information. In 1992, the registers included a column for people to sign out and to state where they started their walk (even though the data was collected it was never systematically used). In 1994, this was expanded to include a date that the trip was finished. Finally, in 1997, a further column was added which asked 'if you changed your walk from your intentions, list actual route here'.

It was found that some registrants were filling in the confirmation columns at the start of the walk. Also, the use of the word 'if' confused some walkers. So, two further changes were made in 1999: the confirmation block was made physically separate from the intentions block in the registration, and the column header was changed to 'where did you actually walk?' (see figure 3). The few remaining entries where walkers fill in the confirmation column at the start of the walk can usually be detected by the characteristics of the handwriting.

Compliance with the 'where did you walk' column was 90% in 1999/00 and 84% in 2000/1. So far, there has been no consistent association between route walked and whether confirmation details are provided. However, of those who did provide these details, about 45% walk a shorter route than intended.

Installing a temporary register on route K for 15 months between 1998 and 2000 validated information obtained in the confirmation section of the register. Almost complete agreement was obtained between details provided in the confirmation columns in the track-head registers and the information collected in the temporary register. This confirmed that those people who confirmed a particular route on route K were physically there. Furthermore, very close agreement has been found between the Federation Peak summit and track-head registers.

Use of auxiliary information in registration booths

Maps are located within each of the permanent registration booths. The more frequently undertaken routes in the area are drawn on the maps and each is given a code number. This can make registration easier for walkers as they just have to write in a number rather than write the route out in painstaking detail. This practice has been in place many years.

For the track manager, however, route codes are only useful if they accurately represent where people are walking. Inappropriate route codes were in place in the Western Arthurs, which lead managers to believe that a certain pattern of use existed when in reality it did not.

The map in the major booth (Scotts Peak) was renewed in September 1997. The old map contained a code that described a circuit that included routes A and E. Prior to 1997 it was believed that up to 40% of registrants were attempting the A to E circuit. Route E is untracked and management were concerned to keep it that way, so the route code for A to E was deleted from the new map to deter people from using it. The results were surprising.

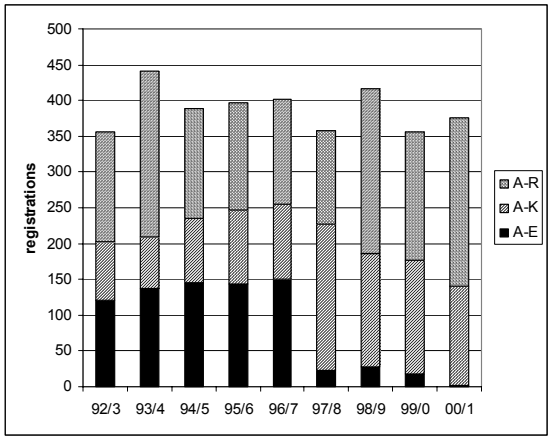

Figure 4. Registrations by route for Western Arthurs, November to March. The route code for A-E was removed from the booth in September 1997.

Numbers registering for A-E route dropped from 150 in 1996/7 to 20 in 1997/8 (figure 4). It became clear over the next few years that substantial numbers of walkers were walking to one of the lakes on the hardened route A and then returning on A, and not walking E at all.

Route codes can only be used where there are few choices of route and those routes are unambiguous. Where there is any doubt, plenty of space should be provided to encourage walkers to describe their route in detail.

Registration compliance rates

Knowing what proportion of the total visitor population to the Arthur Ranges signs in the registers is essential. Not knowing this in the past is one of the reasons why the data were treated with suspicion.

Some of the ways that compliance can be determined (eg. Watson *et al*, 2000) simply are not appropriate for the area. For instance, one method requires an observer near the registration booth to see who registers and who doesn't. However, during the busiest time of the year—a couple of weeks in January—the busiest booth will average three parties departing per day. Likewise, in order to calibrate the track counter installed at the top of route A, an observer should watch parties walking over the counter and compare counts. During the busiest time of the year, it may take one week to observe 40 passes. Movement-activated cameras, of course, would be the ideal solution, but in the current climate these are not politically acceptable.

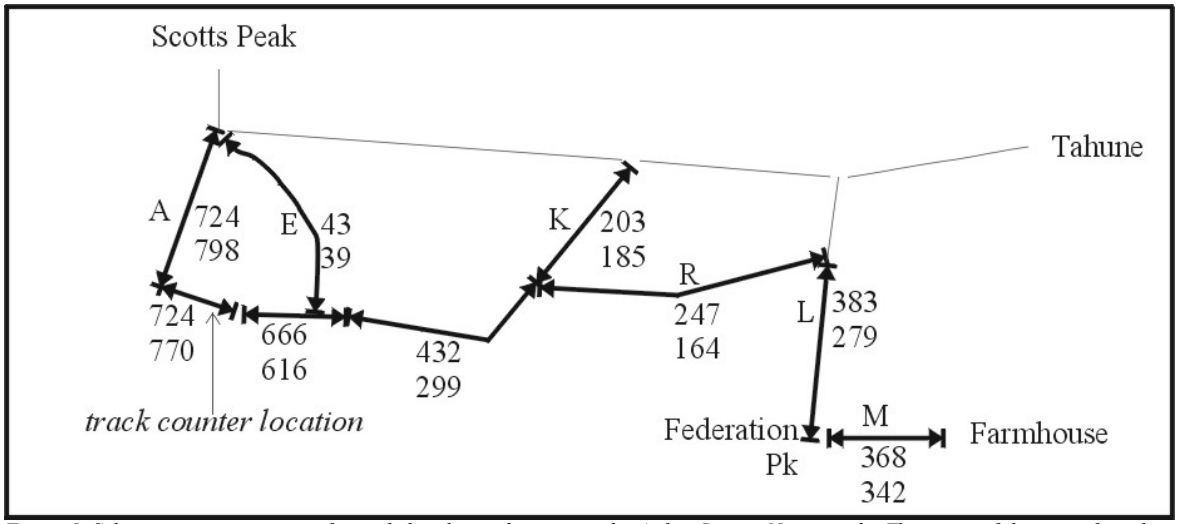

Figure 5. Schematic segment map of intended and actual passes in the Arthur Range. Not to scale. The upper of the pair of numbers adjacent to each arrow denotes the intended number of passes for that segment, and the lower, the actual number of passes as determined by registration confirmation details

The results of walker surveys conducted in a similar areas of the WHA over the past three years have suggested that the registration compliance rate for overnight walkers is 90% or higher.

Reporting

Inaccessibility of data was the final problem identified with the Arthurs data. This was addressed in two ways.

Firstly, registration data is now published regularly as part of the routine yearly reporting cycle, along with frontcountry visitor numbers. Prior to this, data were published sporadically. While stating the obvious, if the data is not made available, the data will not be used.

The more difficult problem is knowing what to report, given the complexity of what is being reported. A simple approach, that has been received very favourably by managers and public alike, is a track segment map of walkers and/or passes per segment. This illustrates how use is distributed across the range, and how this differs when actual use is compared to intended use.

Given that most walkers' intended and actual routes are known, and that those routes are linear, it is a simple matter of allocating the number of passes or walkers to each defined track segment by some simple manipulations of the data (figure 5). These maps do not take registration compliance into account. Also, for those who do not confirm their route, it is assumed that they completed what they intended.

As a crude guide to the accuracy of the system, track counter readings can be compared against predicted number of actual passes. A seismic counter is installed at the location identified in figure 5. The counter is only crudely calibrated, in that Service staff check that it counts on single walker passes. Its behaviour under real life conditions is not known. These counters will record animal (wombat) passes as well, but these are not taken into account. However, the agreement between the predicted value and the counter value provides some reassurance that our predictions are not orders of magnitude in error, which is the first objective of the exercise.

LIMITATIONS OF THE REVISED SYSTEM

The system as described has proved to be useful when monitoring areas where routes are linear. When routes are more complex, as is the case in more open country where people do not stay on tracks, linear maps are not possible. However, zone maps can be produced instead.

Track-head registration data is not useful in predicting use of side-routes. Use of side-routes occurs on the spur of the moment and depends on weather and group dynamics.

The system is labour intensive and is not appropriate for high use areas. Roughly speaking, office time required for data handling is about eight hours per 1000 walkers.

SUMMARY

This paper has described the process by which the walker monitoring system in the Arthur Range was improved by implementing some simple and practical changes in system coordination, data handling and reporting. Another round of public consultation relating to management of walkers in the Arthur Range will proceed in 2002, and it is anticipated that the improved quality of data pertaining to use of the range will assist in providing better environmental and recreational outcomes.

ACKNOWLEDGEMENTS

- Maps are provided courtesy of Land Information Services and Planning Section,

Department of Primary Industries, Water and Environment.

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