

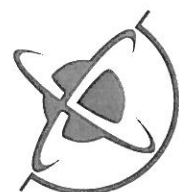
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**Science Report
2001/22**

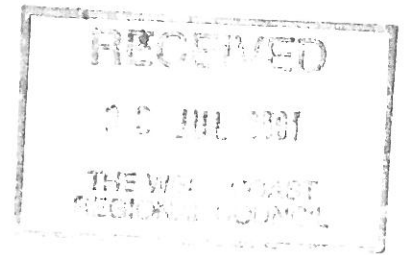
**Changes in
understanding,
awareness and
preparedness
for natural
hazard risk
in Franz Josef
Glacier**

J Gough

July 2001



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**GEOLOGICAL
& NUCLEAR
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Changes in understanding, awareness and preparedness for natural hazard risk in Franz Josef Glacier

J Gough

Institute of Geological & Nuclear Sciences science report 2001/22

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1.0 INTRODUCTION

1.1 Background

This report presents the results of a study on community understanding and awareness of natural hazard risk undertaken in Franz Josef Glacier in March 2001. This study was a follow-up to a previous study undertaken in February 1999, and reported on in Gough *et al.* (1999). The original study was undertaken as part of an Institute for Geological and Nuclear Sciences (GNS) Non Specific Output Funded (NSOF) project entitled '*Developing Risk Analysis for Improving Risk Management*'.

The purpose of the GNS NSOF project was to examine a number of different risk analysis approaches that might be used for natural hazard risk management. The 1999 report examined the use of qualitative analysis of community perspectives as a means of establishing preferences for management options.

1.2 The 1999 study

In 1998 the West Coast Regional Council commissioned a GNS natural hazard assessment (referred to from here as the GNS report) for Franz Josef Glacier. When it was completed, the Council released it to ten selected members of the Franz Josef Glacier community for initial review prior to full release. In February 1999 before the report was released to the general public, a series of interviews were conducted with residents of Franz Josef Glacier, including some of the people who had had the report released to them.

The original study was conducted in three stages. First a socio-economic profile of the community was developed from census data and through interviews with staff from councils, the Department of Conservation (DoC), GNS and members of the community.

For the purposes of the study the Franz Josef Glacier area was defined to include the township and surrounds from the Fox Hills to Lake Mapourika. This area was known to be at risk from a number of natural hazard events. The three events of most concern were:

- Flooding from the Waiho River
- Landslide dambreak flood from the Callery River
- Major movement and earthquake on the Alpine Fault.

Of these three, the first was the issue that had at that time attracted the most attention. Dam burst from the Callery River was seen as being likely to cause flooding and overtopping of the Waiho, while a major earthquake may have follow-on effects on both the Callery and the Waiho rivers. Therefore, while the study addressed both flooding and earthquake, most emphasis was placed on flooding (a) because of the immediacy of the issue, and (b) because of the potential for other events to result in flooding.

The GNS report, released in 1999, contained a series of options for future management of the Waiho River. A meeting of the community reviewers of the report, as well as representatives of the Regional and District Councils, Transit and the Department of Conservation, was held in early February 1999 to discuss the report and to examine these options.

The meeting concluded that a task group should be set up to examine the options for the Waiho River, and to develop plans for implementing the preferred option. Major issues were expected to be availability of resources (including funding and expertise) and the willingness and ability of the community to take ownership of the problem.

1.3 Progress since 1999

In 1999 the proposed task force to examine the options for the Waiho River was established as the Waiho Hazards Management Committee (WHMC). The members of the committee comprise two West Coast Regional Councillors, two Westland District Councillors, and four (elected) representatives from the Franz Josef Glacier community. The committee is chaired by the Westland District Council, which also provides secretarial support. Members of the committee interviewed for this project reported that it had not met for some time, and that they were unclear about the objectives of the process and the role of the committee.

In early 2000, the West Coast Regional Council commissioned R.J. Hall to review the two preferred river treatment options for the Waiho River and to compare these against the *status quo*. For each of these, the report (referred to as the Hall report) addresses and costs construction works and property acquisition. It is now the basis for discussion with government and the community as to future river management options.

In 2000, an international conference called the Gravel-Bed Rivers (GBR) 2000 Workshop was held, and located in Christchurch and Franz Josef Glacier. As part of the conference a number of international visitors took part in a field workshop where they inspected the Waiho River, and held a public meeting to share their observations, which was attended by a number of interested members of the community. The comments received from local community members who attended the meeting indicated that it was considered very worthwhile and while it did not reach any conclusions as to what would be the best option for managing the river, it provided a useful forum for discussion.

There have not been any abnormal rain events in the past two years, and no ‘incidents’ requiring evacuation of low-lying areas. The snow pack for both years has been low.

In October 1999 a significant landslip on Mt Adams caused a dam to develop on the Poerua River north of Franz Josef Glacier. At the time there was serious concern that the dam might break suddenly and cause a wall of water to flood downstream areas, and possibly damage the road bridge. In fact, the dam released water slowly, and while one property suffered serious damage, in general the immediate damage was localised. However, the area continues to suffer from the rapid aggradation of the riverbed caused by the large supply of new sediment, and this may cause problems in years ahead.

This type of event is the scenario that is feared for the Callery River. Of further concern for the Callery is that as the river is not open to general view, it might be some time before the presence of an earth or rock dam was detected, particularly if the weather were bad enough that pilots could not fly over the area. Respondents in the present study reported a minor event in the Callery over the last few months where the river was seen to be “chocolate

coloured” where it joins the Waiho. As it was fine weather, a local pilot flew over and saw a minor slip that cleared within a day.

Several members of the community reported that the riverbed has been degrading under the centre of the bridge to the extent that an old abutment from a previous bridge has become visible for the first time in many years. However, while it is clear that certain parts of the bed (close to the north bank) have degraded, other areas of the bed remain high, and may still be aggrading.

Following the publication of the Hall report and GBR 2000, the West Coast Regional Council has been seeking funding to allow physical modelling of the Waiho system to help with understanding of the system as it currently operates, and to provide some support for structural modification (or otherwise) based on predictions as to the most likely scenarios for the river. The costs for the options listed in the Hall report are beyond the financial resources of the community and the West Coast Region, and the Regional Council is presently continuing its thus far unsuccessful appeals to Central Government for extra funding.

2.0 OBJECTIVES

The specific objectives of the 1999 study were to:

- measure the community’s knowledge about, and understanding of natural hazards that affect their area,
- determine their personal and community preparedness,
- determine whether they feel that the community has been given adequate information to allow them to make their own decisions about the risks, and
- ascertain their views about feasibility and appropriateness of the process that the Westland District Council and the West Coast Regional Council are adopting.

The objectives of the current (2001) study were to:

- review changes in the community's knowledge about, and understanding of natural hazards that affect their area,
- review community understanding and awareness of current processes for selecting a preferred option for management,
- review personal and community preparedness,
- ascertain whether individuals feel that the community had been given adequate information to allow them to make their own decisions about the risks,
- make recommendations for further consultation and communication.

The study did not address individual's views about the specific options for mitigation.

3.0 EXPECTATIONS

As limited resources were available for this follow-up, it concentrated on a restricted set of questions (see Appendix A). Fourteen interviews were conducted, and in most cases these were people who had been interviewed in the previous study. The exceptions were where a previous owner/lessee of strategic business had moved.

The expectations of the study were that it would provide a snapshot of current opinion regarding the river and issue of management. It was hoped that it would provide an indication of changes in attitude, awareness and preparedness.

4.0 PROCESS - THE APPROACH TAKEN

For the 1999 study, a profile of the Franz Josef Glacier community was prepared using Department of Statistics Supermap data, telephone lists, maps, and direct discussions with representatives of particular organisations, such as the Department of Conservation, Regional and District councils.

From this profile a survey was designed. This involved preparing a schedule of questions to be used in a series of semi-structured interviews of key individuals in the community. A preliminary list of 'key informants' was established with the help of the West Coast Regional Council, the Westland District Council, Dr Mauri McSaveney from GNS, and the Department of Conservation in Hokitika, and supplemented by listings from the telephone book 'Yellow Pages'.

While the profile developed in 1999 was recognised as being significantly out of date, it was not considered practical or feasible to update for the 2001 study. Since 1999, a number of new businesses have been started, and others have expanded. Without a full survey of all the businesses in the town, it would not be possible to estimate current employment, or permanent residency. It is expected that data from the current census (2001) will be available in two or three year's time when the next follow-up is planned (see suggestions).

This study concentrated on interviewing members of the community. Priority was given to re-interviewing individuals who had taken part in the original study, and some additional respondents were incorporated. Re-interviewing individuals meant that data obtained from the 2001 interviews could be related back to the original interviews, thus allowing changes in awareness and attitude to be identified.

The previous study had some difficulty with setting up interviews in advance of the fieldwork, as few people were prepared to make appointments for interviews more than a day in advance. In this case letters were sent out six weeks prior to the intended visit. One week before the visit telephone calls were made to all of those written to, and as a result nine interviews were organised in advance. Of the five remaining interviews conducted, three were new (two new residents, and one new to the study).

All interviews were conducted in people's homes or businesses. Interview notes were taken by hand and typed up at a later date. The information was analysed using *askSam*, a text based data analysis programme commonly used for analysis of qualitative data. Using the attached schedule (Appendix A), a set of keywords was identified and used to assist in collating the information.

While an important principle of qualitative research is to verify as much information as possible, in this instance only limited validation was possible. Discussions with additional community members (not included in the interviews) and Regional and District council staff were used to provide verification where differences in fact were noted.

5.0 RESULTS

Fourteen complete interviews were conducted. Of the interviewees, 11 had been interviewed for the 1999 study. All of those who were re-interviewed were enthusiastic about being interviewed, and expressed interest in being approached again. Only one person approached declined to be interviewed for personal reasons (unrelated to the study).

The remainder of this section reports on the findings from the interviews under a series of broad headings relating to the questions posed.

5.1 Awareness, attitudes and preparedness

From the responses received it can be concluded that there has been a change in awareness of natural hazard events over the past two years. People know about the GNS and Hall reports and this has raised awareness. It is less conclusive as to whether this awareness has had any significant effect on either attitudes towards natural hazard risk or preparedness for natural hazard events.

Most of the moteliere interviewed had considered the scenario of being cut-off for a number of days, and considered that they had enough food on hand for immediate needs. While few had standby generators, most had alternative cooking in the form of gas barbecues. Businesses reported themselves as being better prepared mentally for both flooding and earthquake than they had been in 1999, and noted that they had tried to prepare staff in terms of what to do, but found a difficult balance between preparing them and frightening them.

Several respondents stated that in their view the community is still not prepared. One notable difference from 1999 is that over the past two years a split in attitude has developed

between residents of the north side of the river and the south side, and as time goes on this is becoming entrenched. One south-sider reported being told by 'town' people that " 'we' are going to be washed away", to which she responded "when", and stated that "we call ourselves south Franz Josef".

However, most of the individuals interviewed believed that they were better prepared mentally for flooding and earthquake than two years ago, both personally and in terms of their business. Several participants thought that Chris Morris (the Civil Defence controller) had helped to raise awareness by asking businesses to specify their plans.

Reference was made to a council meeting on earthquakes and flooding that was "really graphic and had a strong impression". In terms of flooding, the comment was made that "it's going to happen, and not a lot you can do about it".

5.2 Mt Adams

Only one respondent was unaware of the Mt Adams slip. All other respondents recognised that there was a parallel between the event in the Poerua and the potential for an event in the Callery catchment.

One respondent felt that while it was a possibility, it had a very low probability and that the event in the Poerua had more effect in terms of precedent on the scientific community than on the local communities on the West Coast, who believed that they were familiar with a wide range of natural hazard risks.

Four respondents felt that it didn't have much effect on the community, but the other respondents believed that it raised awareness in the local community.

5.3 Information

The problems noted with information flows in 1999 remain. A number of businesses do not receive information about meetings because they are leasing the business, and the notices go to the owners/ratepayers. Similarly individuals who do not own property do not receive

information. Most of the respondents were concerned about what they saw as problems with communication between the council(s) and the community at large.

Respondents in nearly all cases stated that they would like more direct contact with Regional and/or District Council, not necessarily in the form of meetings (which are often held at times that are not convenient, as well as the continuing problem of not hearing about them until too late), but in the form of mail outs that get to all members of the community.

It was suggested that information should go in all letterboxes (and post boxes) and also be distributed through employers. A centrally located notice board would be useful. People who are working in certain areas (DoC and guiding) get the information, but “while most people know about the hazards they don’t necessarily know about the risk.”

It was pointed out that individuals and businesses need information often, and especially at the beginning of the season (when new staff arrive). Businesses should be given information in a form that is suitable for staff and visitors. It was suggested that the District Council could prepare a document to be given to employers, and passed on to employees that contained useful, practical information (not scare tactics).

The GBR 2000 workshop was considered to be a great success, and respondents expressed their gratitude at being invited to take part (though one respondent commented that they didn’t go because they thought it wasn’t open to all the community). For those that attended it “clarified a lot of issues” but at the same time showed that “nobody knows” when an event is going to occur, and what might happen. In line with comments that people understand the hazard but not the risk, it was noted that you can “plan for the consequences, but not for the event”.

Members of the Hazards Management Committee commented that they get enough information, but that they don’t know how much the general community gets.

5.4 Issue(s)

Key issues were identified as being:

- the difficulties of dealing with flooding at night
- the vulnerability of the sewage ponds
- the large amount of money being generated over-riding 'sane' decisions
- a growing north-south side split
- a need to 'do something' rather than talking/modelling.

It is very difficult to gauge the level of the water at night and when it is raining there is always mist on the water, which makes visibility difficult or impossible.

In addition, visitors don't perceive any danger. There was a small event three or four years ago, and it took 40 minutes to evacuate 28 people from the south side of the river. A number of other practical problems were identified from this event. Someone needed to be stationed at each end of the bridge during the evacuation to make sure that the crossing was safe (some people crossed on foot, some by car and some by bus). During this last event, the people at each end of the bridge were unable to 'talk' to each other. For future events, people in these roles should have radios.

It was noted that people evacuated by bus are easier to deal with than people in cars, because when you have a group on a bus you have a captive audience and you can talk to them and explain what is happening, where they are going, and what is going to be done. If everyone is simply collected in the hall, people go off in groups and don't listen. They don't like giving names and it is difficult to make sure that everyone is accounted for, and accommodated.

If the sewage ponds were flooded the town would be in serious trouble very quickly and would need to be closed down – the "town [is] held to ransom by [the] sewage ponds".

A huge amount of money is being generated in Franz Josef Glacier and many respondents believed that this was causing problems through people ignoring warnings and taking risks in order to achieve financial gain. A new bar has been opened on the south side of the river which has caused 'muttering', as residents generally believed that there wasn't going to be any more development on the south side of the river.

New investors are at times "either naïve or stupid" – "didn't know about flood risk [when they bought the lease]". There seems to be little checking by banks and insurance companies when lending money to invest or selling insurance.

People who live and have businesses on the north side of the river choose to believe that if the river breaks out it will go south. As noted previously, the events of the past two years, and in particular the zoning decision with respect to the south side of the river, has caused a serious split between people on the north side and people on the south side who are adopting an 'isolationist' perspective. The Franz Josef Glacier community is small, and the divisive effects of the 'us' and 'them' attitude that is developing are likely to be serious, and may cause difficulties in getting community 'buy-in' to any direct actions by the council(s).

A number of respondents were concerned that the physical studies will take at least two years to produce any results, by which time a serious flood could have occurred. Another concern was that there was inadequate data for modelling, and that monitoring (causing further delay) would be needed before a "proper investigation" could be undertaken.

5.5 Civil Defence

It was noted that DoC has plenty of resources and is ready to move to supply help, but is not in a position to initiate or direct any Civil Defence activities - that is the role of the Civil Defence personnel.

There was general uncertainty about the current status of Civil Defence. The Civil Defence co-ordinator lives in Okarito and also drives the Magic Bus. This means that there are significant periods of time when he is not available. In addition, if a major event occurred in

Franz Josef Glacier it is very unlikely that he would be able to get there from Okarito. Several people felt that Okarito was not a suitable base for the co-ordinator as it is likely to be cut off in either a flood event or earthquake. Until recently the co-ordinator was not on the telephone in Okarito.

Nobody interviewed or spoken to was able to say who was second in command of Civil Defence, or who would take over if the co-ordinator were not present.

Concern was expressed about the ability of the community to respond because of disjointed nature of planning and lack of co-ordinated effort of Civil Defence. The social welfare group is active, and appears to be a strong team that meets annually to talk through scenarios, and go through responsibilities. The group leader visits all new owners of accommodation units to talk through the issue of providing beds in an emergency. One possible concern is that both the leader and deputy leader of the social welfare group are leaving the area over the next year.

One suggestion was that Civil Defence needs a full time resident as co-ordinator, and that preferably it should be a paid position (even if nominal).

Most of the motels reported having a copy of the new Civil Defence plan on hand, and noted that the Civil Defence controller had discussed the problems with them individually. A number of respondents noted that the Civil Defence controller had spent a lot of time working on the new plan, and that they were generally happy with it.

In general there was considerably more support for the Civil Defence controller than there had been two years previously, despite the serious concerns expressed about whether he would be present in an event, and who else would take over.

5.6 Modelling

Respondents were asked to comment on their knowledge of the 'Hall report', and to give their view on whether physical modelling of the catchment would be valuable.

Few of the respondents were aware of the report. Those that were aware expressed confidence in the figures, but were concerned about where the money would come from to implement any of the options. Members of the Hazard Management Committee that were interviewed felt that their views had been dismissed and that their 'preferred option' had not been costed.

There was some optimism that the results of the physical modelling proposed in the Hall report might encourage the government to provide financial support, but there was little support for the concept of physical modelling except in that the results might be used to get financial assistance for active management of the river. Only one respondent expressed direct support for the model to the extent of being comfortable spending local money on it. It would be "all very well if it was a way of obtaining money", but "would rather see the money spent on the river", or it would be "better to use the money to shift the camp".

Comments referred to "the sandpit" and considered it a "waste of resources", "no proven benefit", and "no data".

5.7 Council

There was little direct comment about the council(s) except in the context of providing information. However, one respondent felt that the council(s) had treated the previous owners of the motor camp "shabbily". And it was noted that public relations need improvement, as it all becomes a personality issue. There was considerable support for the Regional Council, and a reasonable understanding of the relative roles of the District and regional councils.

5.8 General

Three of the interviewees who were also long time residents noted that they were planning to leave the community within the next two years. All of these were people who had had long involvement in community matters and had important roles in hazard management through involvement with Civil Defence and local knowledge.

There is a continuing problem in the area with short-term staff that is being exacerbated by the lack of staff accommodation. A number of businesses have built accommodation for staff, and others have assisted staff in finding accommodation in places such as Okarito and Whataroa. A local builder has been canvassing support for building accommodation units on land he owns on the outskirts of town. For this to progress it will require a substantial commitment by local employers.

It was noted that lack of accommodation was a significant problem for businesses who were not able to provide it for their staff, but who wanted to attract long-term staff that would stay and contribute to the community. In turn, the high turnover of staff (especially over the summer months) is causing social problems in the town. During the 2000-01 summer there were large numbers of young people working in the town and holding late night parties that affected other residents with children who work more regular hours. In some ways families are being forced out of the central area, and with no land available for building, there isn't anywhere they can easily go.

6.0 SUMMARY AND CONCLUSIONS

This report describes the results of a survey of residents of the Franz Josef Glacier community. The small size of the survey means that detailed analysis of the results is not appropriate. However, because most of the interviewees were also interviewed in the previous survey in 1999, it can be used to give an indication of the types of changes that have occurred in the community since that time.

While the socio-economic profile of the community was not updated for the 2001 survey, it is clear from observation of the new developments and the high occupancy rates being experienced by motels that there is significantly more economic activity than there was in 1999, and that the local economy is continuing to grow. The main limitations to economic growth appear to be lack of land for development, and an increasing shortage of staff accommodation (closely linked).

The key changes in attitude and awareness were that individuals are psychologically more prepared for a natural hazard event. In addition, civil defence planning was given more support than previously.

Points of concern were the growing north-south side split within the community, and the impression that the large amounts of money being generated in the community are having an adverse effect on planning for natural hazard disasters by causing individuals to avoid the issue.

In addition, while civil defence planning has progressed, there is still little understanding in the community about the specifics of the plan and its implementation.

There is little support in the community for physical modelling other than a recognition that this may be only way to obtain financial support for funding river management. Older residents are worried that time is passing, nothing is happening, and that there will be major flood before anything is done.

It was notable that with a number of the questions the individual responses tended to adopt an 'us and them' approach of – yes, we are aware, but no, we don't think the community is. This points to the need to undertake a wider survey of the community before any conclusions about community awareness can be reached.

7.0 SUGGESTIONS

The following 'suggestions' that arise from this project do not have the status of recommendations because of the limited base of the survey.

The basis of the recommendations is that Franz Josef Glacier will continue to be at risk from natural hazard events, and that a mixture of structural and non-structural measures will be required to manage the risk. Consultation and communication with the community will be an important item in ensuring that that the measures adopted are acceptable and feasible.

These two elements are necessary because community 'buy-in' and ownership will be essential aspect of any effective risk management plan.

The suggestions concentrate on two areas: development, maintenance and enhancement of communication channels, and continual review of community awareness and preparedness. The latter will provide feedback for the former.

7.1 Suggestion 1

Councils should continue working to improve information channels, and to use the suggestions of the community which include:

- newsletters to be distributed to all residents
- pamphlets for businesses to give to staff
- a notice board for meetings, and general information about hazards
- regular reminders of the issues relating to natural hazard risk in the area.

7.2 Suggestion 2

Councils and researchers should review the situation in two-three years time¹, and undertake a further (expanded) survey of the community to determine current hazard awareness and understanding.

This should include:

- preparation of a full socio-economic profile
- structured interviews with 10 key informants
- semi-structured interviews with 20 residents from different sectors
- a stratified random mail questionnaire to be circulated to all members of the community.

The focus of this survey will depend on the status of (any) structural works.

¹ The timing of the survey should take account of the availability of 2001 census data.

8.0 REFERENCE

Gough, J.D. Johnston, D.J., McSaveney, M. 1999. Community response to Natural Hazard Risk Franz Josef Glacier. Institute for Geological and Nuclear Sciences Science Report 99/10.

APPENDIX 1: Interview Schedule

Part 1: Attitude

Do you think your attitude towards natural hazards and the risks associated with them has changed on the last two years?

How do you think it has changed?

Why do you think it has changed?

Do you think that you (personally) are more prepared? Mentally? Physically? How are you more prepared?

Do you think the community's attitude has changed? How?

Do you think the community is more prepared?

Do you think that the Mt Adams (Poerua river) slip had any effect on you? The community?

Part 2: Information

Do you think that you have enough information about natural hazards and the risks associated?

Do you get information from the Council(s)?

Would you like more/less information?

What type of information would be useful?

How would you like to get it?

Part 3: Options

Are you aware of the report that was done for the Council costing the two options? (Hall report)

Do you think it was useful?

One of the recommendations was for physical modelling of the catchment – do you think this would be useful?

Part 4: Civil Defence

Do you have any involvement with Civil Defence?

What do you know about the local Civil Defence system? Who is in charge? Is there a plan?

Have you seen a copy of the plan? Do you have any particular responsibilities? If the controller were not present who would take charge?

Keywords

Name

Date

Location

Prepared

Conscious-flood

Conscious-earthquake

Plan

Issue(s)

Information

Change-attitude

Hall-report

Civil-Defence

Poerua

Modelling

Infrastructure

Council

General

Accommodation