Disaster Risk Management
From a Remote Shire's Perspective

By

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1 INTRODUCTION

Natural diasters such as floods, bushfires, cyclones and severe storms are very much part of the natural workings of the earth and are not problems in and of themselves (Geis 1996). However, these hazard events do become a problem when they impact on human settlements. The severity of the impacts associated with a natural disaster event are greatly affected by the built human environment and our settlement patterns.

In response to this, definitions of 'disaster' generally contain reference to their associated human impacts. The Queensland Department of Emergency Services, Disaster Risk Management Guidelines define a diaster, as a catastrophic event that severely disrupts the fabric of a community and requires the intervention of various levels of government to return the community to normality (Zamecka & Buchanan 2000).

It is at this interface between natural disasters and the human environment where potential for management and mitigation of disaster risks can be found. While traditional disaster treatment activities have focused on response and recovery, recent developments in the field have increasingly leaned towards management and mitigation. This shift is the result by research indicating that proactive actions are vital to achieving a reduction in community vulnerability, maximising safety and minimising the economic impacts of disaster events.

Disaster Risk Management is a systematic process that produces a range of measures that contribute to the well-being of communities and the environment. The process considers the likely effects of hazardous events and the measures by which they can be minimised (Zamecka & Buchanan 2000). One of the main components of Disaster Risk Management is community consultation. The Yokohama Message, presented at the halfway point of the International Decade for Natural Disaster Reduction, indicated that community involvement allowed valuable insights into individual and collective perceptions of risk and development and allowed researchers to understand the cultural and organisational characteristics of the study area (UN Chronicle 1994).

The Department of Emergency Services Disaster Risk Management Guidelines (herein referred to as the Queensland Disaster Risk Management Guidelines) are Queensland's accepted framework for the preparation of Disaster Risk Management Strategies. These guidelines also place a great emphasis on achieving effective

community involvement as it enhances community understanding of risk, increases active participation and acknowledges the conflicting values involved in the decision making process (Zamecka & Buchanan 2000).

This study involves the examination of the Disaster Risk Management Strategy prepared for the McKinlay Shire located in Central Western Queensland. The main focus of the study is a review of the effectiveness of the community consultation strategy adopted utilised in the McKinlay study and an examination of the applicability of the Queensland Disaster Risk Management Guidelines to a remote Shire. Included in this was the identification and description of the issues that relate to consultation strategies used during the preparation of a Disaster Risk Management Strategy for a remote Shire. The second part of the study focused on an examination of the opportunities for remote Shires to incorporate Disaster Risk Management into Local Government planning.

To examine the current community involvement methodologies used in the preparation of Disaster Risk Management Strategies, and to establish best practices, a literature review was conducted and is included in this thesis as Chapter 2. The methodology prescribed in the Queensland Disaster Risk Management Guidelines, background information, and the methodology adopted by the McKinlay Shire Study have been described in Chapter 3. This chapter also contains a description of the methodologies used in this study to achieve the research aims.

The analysis of the effectiveness of the McKinlay Shire consultation strategy and the applicability of the Queensland Disaster Risk Management guidelines are reported in Chapter 4. Chapter 5 is concerned with an examination of the possibilities that could be utilised to incorporate Disaster Risk Management into Shire planning. The final chapter provides a general discussion concerning the role of Shire planning in the adoption and implementation of Disaster Risk Management outcomes and the constraints and opportunities that are present in a remote Shire.

2 COMMUNITY INVOVLEMENT IN DISATER RISK MANAGMENT

2.1 **Disaster Risk Management**

Disaster Risk Management is a systematic process that produces a range of measures that contribute to the well being of communities and the environment. The process considers the likely effects of hazardous events and the measures by which they can be minimised (Zamecka & Buchanan 2000).

Disaster Risk Management studies can result in a variety of actions that can be used to reduce community vulnerability and lessen the impacts of hazard events. Lichterman (2000) describes three disaster mitigation techniques: hard, soft and community mitigation resources. Hard mitigation involves the construction of the built environment in such a way that it withstands the impacts of hazard events with little human intervention. This may include engineering modifications to waterways, the application of building standards, the provision of fire suppression systems, uninterruptable power supplies and on-site emergency systems.

Soft mitigation is associated with emergency preparedness or response in the wake of a hazard event. This includes activities such as fire suppression, sandbagging, search and rescue, the provision of first aid, emergency care and emergency shelter (*ibid*). Soft mitigation reduces the effects of disasters that can not be alleviated by hard mitigation.

Community mitigation resources involve the training and education of community members to act in such a way that reduces community vulnerability to hazards and provides positive assistance during post disaster response and recovery. Community mitigation includes awareness raising activities, emergency training by police, fire and mental health services, as well as community based disaster action groups (*ibid*).

Changes in attitudes towards the management and mitigation of disaster events has also occurred over the past 30 years with a shift in focus from recovery and response to management and mitigation. The Queensland discussion paper for the State Planning Policy on Land Use Planning for Natural Disaster Mitigation (2001) indicates that over the last 25 years, Australia has on average, experienced a major disaster event every four years. These have included Cyclone Tracey, The Ash

Wednesday Fires, The Newcastle Earthquake, The Thredbo landslide and major flooding in Brisbane, Nyngan, Charleville, Katherine and Benalla (Queensland Dept Emergency Services 2001). Hodges (1996) supports the idea that one of the major catalysts for change in Australian attitudes can be attributed in part to a number of these earlier disaster events in the 1970s, in particular, the Brisbane floods (1974) and Cyclone Tracy (1974).

Historical records show that Queensland is more disaster prone than other states with regular storms, cyclones, bushfires and flooding events (Queensland Department Emergency Services 2001). In response to the number and severity of these hazards the Queensland Government released the *State Counter Disaster Organisation Act, 1975* that required all local governments to prepare a Local Counter Disaster Plan to deal with all counter disaster measures and establish a local emergency service. The *State Counter Disaster Organisation Act, 1975* was still primarily focused on response and recovery but allowed enough scope within the counter disaster plans for some local governments to incorporate some mitigation aspects.

International recognition of the possible benefits that could be achieved by adopting a proactive approach to Disaster Management and Mitigation received a boost with the United Nations declaring 1990 – 2000 the International Decade for Natural Disaster Reduction (IDNDR). The purpose of the decade was to marshal the political resolve, experience and expertise of each country to reduce loss of life, human suffering and economic losses from natural hazards (UNESCO Courier 1997).

One of the principal themes to come out of the decade included the need to adopt a more proactive approach to disaster management than had occurred in the past. This required a shift in focus form disaster response and recovery to management and mitigation. The IDNDR also highlighted that a high level of community involvement is of fundamental importance to the success of disaster management activities.

2.2 **Community Involvement in Disaster Management**

Community participation is one of the underlying principles of democratic societies (Butler et al 1999). In recent years, recognition of the importance of community involvement and participation in many streams of environmental policy has steadily

increased (Fordham 1999). The recent emphasis placed on the need for effective community involvement and increased awareness of its potential benefits has been stimulated through a variety of international actions such as the United Nations Conferences and inter-governmental agreements.

The 1992 United Nations Conference on Environment and Development called for, among other things, greater involvement of local communities in achieving sustainable development and placed an emphasised on the need for a greater level of public participation and involvement in the decision making process (Dover 1998). The subsequent documentation generated from the Conference, The Rio Declaration and Agenda 21 Action Plans for Sustainable Development demonstrated continued support for an increase in the level of community involvement in environmental policy (Fordham 1999).

The Local Agenda 21 program also enhanced community involvement in Australian environmental policy. The program was aimed at implementing sustainable development initiatives at the local level (Environment Australia 2001). The program is comprised of systems and process that can be used to integrate environmental, economic and social factors with development. Some of the key outcomes proposed in the document indicated a movement towards enhancing community participation through policies such as; developing stronger partnerships between communities and local authorities, integrated decision making and ongoing community involvement in the resolution of sustainable development issues (Environment Australia 2001).

These international movements prepared a base for the integration of community involvement in Australian environmental policy. Recent legislation and national strategies such as the National Strategy For Ecological Sustainable Development, the *Integrated Planning Act, 1997* (Qld) and *Environmental Protection Act,1994* (Qld) have provided guidance and statutory requirements for community involvement in environmental policy and development issues.

The importance of community involvement and community-based approaches to disaster management and mitigation is now widely acknowledged. The Yokohama Message presented in May 1994 at the halfway point of the IDNDR indicated that community involvement should be encouraged as an essential part of effective disaster management. The message highlighted that effective community involvement allowed insights into individual and collective perception of development

and risk, achieved an increased understanding of the cultural and organisational characteristics of each society, as well as giving researchers the ability examine human behaviour and interactions with their physical environment (UN Chronicle 1994).

Similarly, the International Federation of the Red Cross and Red Crescent Societies' Policy for Disaster Preparedness also indicates a need for community involvement to ensure that disaster management is sensitive to the community's gender and age distribution, generation and vulnerability, and, adequately addresses the community's actual needs (Goodyear 2000).

The Queensland Disaster Risk Management Guidelines also places great emphasis on achieving effective communication with the community. The guidelines define effective community communication as a process that enhances community understanding of risks, increases active community participation in debates about risks, and acknowledges the conflicting values in decision making under conditions of uncertainty (Zamecka & Buchanan 2000).

At the most basic level, community involvement is important to gain an understanding of the basic profile and structure of the community. Ferrier (1999) notes that just as every individual is different, every community, whether large or small is also different. In order to effectively manage, and meet the needs of a community during a disaster event it is important to understand the composition of the community. Although basic population profiles can be achieved through demographic analysis of census data, community involvement techniques should be used in conjunction with the analysis to develop a clearer understanding of cultural and social factors.

Buckle (2000) indicates that there is a need for disaster managers and consultants to engage with the community and recognise the values of involvement as an integral part of effective disaster management. Community involvement measures should cover a range of issues including; the development and implementation of emergency management procedures, public contribution to disaster policy and programs, monitoring the progress of community services and the provision of mutual aid (Buckle 2000).

Support in the literature indicates that effective community involvement should occur early in the decision making process (Kasperson 1986 Bruton 1980 *in* Fordham

1999, Zamecka & Buchanan 2000). In this fashion, community involvement should occur before any major decisions have been made and before any options are excluded from the study. Research has also shown that a lack of collected information at early stages of the study process can create confusion and limit the effectiveness of the consultation process (McNab 1997 & Kasperson 1986 *in* Fordham 1999).

2.3 **Top Down and Participative Approaches to Community Involvement in Disaster Risk Management**

While there is wide support in the literature describing community involvement as an integral part of effective disaster risk management, the approach to involvement and the extent to which the community should paly a part in the construction of policy or management strategies has long been a topic of debate. Arnstein's "Ladder of Citizen Participation", first published in 1969 has provided the foundation for analysis of the community participatory techniques. The eight rungs of the ladder ranges from total citizen control through to manipulation of the public. This simplified illustration demonstrates the gradations of citizen participation through techniques of complete citizen power, tokenism and non-participation.

Figure 1. Arnstein's Ladder of Citizen Participation

8	Citizen Control	Degree of Citizen Power
7	Delegated power	
6	Partnership	
5	Placation	Degree of Tokenism
4	Consultation	
3	Informing	
2	Therapy	Non-participation
1	manipulation	

Source: Arnstein 1969

The push for greater levels of community involvement in environmental policy, including disaster risk management can be attributed in part to the series of international events that brought the community to the forefront of environmental

policy. The push for increased participation in disaster management can also be attributed to the fact that one of the defining elements of a disaster is that they inflict some degree of pain and suffering on individuals, even when there is no damage or loss of physical infrastructure (Buckle 1996). These human impacts associated with disasters have increased community concern and heightened community awareness, which has created the need for more comprehensive community involvement in the disaster management process.

There are two main approaches used to achieve community involvement in disaster risk management: top down approaches and participatory approaches. It can be seen that these approaches, in their purest form, represent the alternate ends of Arnstein's ladder (Mitchell 1998, Twigg 1999, Fordham 1999). Mitchell (1998) describes top down approaches as the imposition of objectives on communities that are established by decision-makers without meaningful consultation. Adopting a solely top down approach to community involvement in disaster risk management has been criticised as it generally involves a greater concentration of authority, narrowly prescribed levels of discretion, a reliance on hierarchy and the imposition of managerial performance standards (Mitchell 1998). Twigg (1999) also notes that top down approaches may be susceptible to manipulation by political interests, are often inefficient and may lead to an increase in community vulnerability. In spite of these limitations, studies by McDonald (1999) indicate that the scope of participation in environmental policy is often limited to rubber-stamping or, at best, fine-tuning of predetermined government positions. Some examples of top down techniques that may be used in disaster risk management include sample surveys, interviews, and public information presentations.

The participatory approach to community involvement generally requires a greater degree of citizen power and control within the decision making process. Adopting a participatory approach to community involvement allows the public a greater ability to affect the aims, objectives and outcome of disaster management in their area (Fordham 1999). Participatory techniques that may be employed in disaster risk management activities include, community working groups, community reference groups, workshops, public discussions, dialogue and submissions.

Traditionally, mechanisms to facilitate community involvement in disaster management have been rigid, command and control or " Top Down" methodologies. Fordham (1999) notes that due to the often complex nature of diaster management,

past strategies have often relied heavily on expert opinion which has created a gap between the community and disaster management professionals. This gap was generated through the opinions of technical experts who perceived that the nature of disaster management was too complex to involve the general public. The problem was further exacerbated by the members of the general public who felt ill equipped to discuss or provide comment on work prepared by experts (McDonald 1999). As a result of this situation, past disaster management strategies have been criticised for being ineffective in responding to the community's actual needs and achieving their desired management outcomes (Maskrey 1989 *in* Twigg 1999).

Other criticisms of top down approaches relate to the possible influence of political pressures, inefficiencies in the use of resources and the possibility that adopting this approach may contribute to an increase in community vulnerability (Twigg 1999). Fordham (1999) also notes that Top down approaches and poorly designed participation mechanisms can lead to an unacceptable polarisation of the community's views.

The failure of community participation efforts in the past may also be the result of the attitudes of key players towards community involvement in disaster management. Twigg (1999) highlights that State agencies, government departments, non-government organisations, and disaster professionals are likely to be bureaucratic in structure and system, inflexible in their thinking and actions and still wedded to obsolete theories. The introduction of these political dimensions and agendas can severely hinder the resources devoted to community involvement, and limit the influence the public may have on the management process.

In spite of the support shown in the literature for participative approaches to community involvement in disaster management, practice generally lags behind theory. Top down consultation where a chosen option is promoted to the public with little ability to accept or reject management actions is still common (Twigg 1999, Fordham 1999). Pagram (1998) argues that the delivery of disaster services that better meet the needs of the community will require shifts in emergency service management and service provision from these traditional methodologies.

This call for change in the approach to community involvement is echoed through research that has demonstrated that top down practices are less beneficial than the adoption of a more participative approach involving greater improvisation and

flexibility (Mitchell 1998, Salter 1996). At the crux of these methodologies is the need for community partnerships, high levels off communication, and an increased role of the community within the decision-making process.

There are a variety of benefits associated with the adoption of a participatory approach to community involvement in disaster risk management. These benefits have received much attention in the literature and driven recent moves towards incorporating a higher degree of community participation. Firstly, the adoption of a participatory approach to community involvement gives disaster managers an effective tool to gauge an understanding of today's communities, which differ greatly from traditional views of community. Traditional views of a 'community' give the image of a homogenous group of people living in a defined area with a stable set of interactions that are spatially referenced (Boughton 1998, Buckle 1996, Twigg 1999). This view of communities has changed as a result of increasingly mobile populations, more frequent changes in occupation, increasing migration and technological advances in communication and travel (Buckle 1996). Research that has sought to define 'today's' communities for emergency management have demonstrated that professional association, lifestyle choices, occupation, shared experiences should be used to define communities as well as their spatial aspects (Buckle 1996, Boughton 1998).

Because of these changes, traditional top down approaches to disaster management may not adequately address the vulnerability, needs and define the social and cultural constructs that are present in each individual community. Adopting a participatory approach that involves dialogue and a higher level of interaction with members of the public, allows the researcher to clearly define who the community is and identify exactly who the vulnerable are (Buckle 2000).

One of the most commonly argued benefits of community involvement in disaster management is that any form of participation raises awareness which in turn, reduces risks and the populations vulnerability (Twigg 1999, Burby et al 1999, Soste & Glass 1996). Beck (1994) supports the notion that the first step in disaster preparedness must be to increase community awareness of their vulnerability to disaster. Rouhban (1997) also supports this view indicating that educating and informing the public is a permanent measure of paramount importance in reducing community vulnerability to disaster events.

Through heightened awareness of potential dangers, the community is more likely to adequately prepare for disasters. The Queensland Disaster Risk Management Guidelines highlight that community involvement helps to increase understanding of hazards and their consequences which can be helpful to people coping with disasters when they occur (Zamecka & Buchanan 2000). The potential benefits and importance of awareness raising community involvement techniques are further highlighted by Australian studies that have demonstrated inadequate levels of awareness and preparedness for predictable and regular hazards events such as floods and cyclones (King 1999, Skertchly & Skertchly 2000).

Soste (1996) demonstrates that disaster education programs and community involvement within the management process can contribute to a greater understanding, awareness and response to warning systems that can lead to the creation of a more prepared community and result in a substantial reduction vulnerability.

Along with raising awareness of risks and community vulnerability, participatory community involvement can also create a sense of community ownership of disaster management and mitigation programs. Work by Burby *et al* (1999) indicates that effective community involvement can contribute to the creation of a base of citizen support for disaster mitigation and management actions. The Queensland Disaster Risk Management Guidelines also indicated that effective community participation can aid in the development of personal roles and responsibilities within management tasks as well as contributing to a sense of community ownership of the outcomes of the disaster risk management process (Zamecka & Buchanan 2000).

Post disaster analysis by Scanlon (1996), indicates that although formal government and emergency services do play a significant role in disaster planning and response, in the wake of a disaster event, the response actions and needs are met by the community and not formal organisations. In such cases, search, rescue, medical treatment, evacuation and transportation to hospitals is performed by individuals, family members and neighbours. Participatory approaches and the development of individual roles and responsibilities can aid in the formation of more cohesive and effective response among the local community who are first on the scene.

In the wake of the Ash Wednesday fires, spontaneously created local committees were formed that performed the initial search and rescue tasks, administered medical

assistance and provided emergency shelter. In the later stages of disaster response and recovery, these committees proved to be an effective mechanism to aid formal disaster workers in the distribution of resources and aided communication between locals and the Government regarding recovery actions, management options and the explanation policies (Buckle 1996).

The formation and benefits of local response teams in this example highlights the possibility of effective response and post disaster management at a ground level. Effective community involvement can actively establish such response groups, reinforce emergency training, enhance local organisation and help prepare those people who are first on the scene in the wake of a disaster event (Scanlon 1996, Zamecka & Buchanon 2000).

Adequate levels of community involvement also allow the community to express their real needs and priorities in the case of a disaster event and explicitly discuss services provision and aid requirements. Community involvement is also a method of gaining insight into the local environment and the wealth of local knowledge that may have been dealing with disaster events for generations.

2.4 **Achieving Effective Community Involvement in Disaster Risk Management**

In spite of the support shown in the literature for the adoption of a more participative approach to community involvement in disaster risk management, practice has generally lagged behind theory and top down approaches are still common. One of the main reasons for this is that effective community participation is inherently hard to achieve. As mentioned earlier, the traditional view of communities has changed from a homogenous and spatially referenced group of people to a more mobile and diverse population that is comprised of a dynamic mix of different subgroups and attitudes (Buckle 1996, Twigg 1999). Buckland & Rahman (1999) argue that communities defined by high levels of social capital (that is a wide diversity of groups and opinions) decision making processes are more complicated, expensive and harder to implement.

Studies have attributed the reliance on top down approaches to their speed, cheaper costs and simplicity of results when compared to participatory studies (Twigg 1999, Fordham 1999, Parkes 2000). Top down approaches have been used to complete

consultation requirements with community members at the expense of effective dialogue with community members and a thorough examination of the diversity of opinions within a community (McDonald 1999).

To gain the benefits form the adoption of a participatory approach to community involvement, more expensive and time consuming techniques must be employed. Twigg (1999) suggests that successful community involvement in disaster management requires time, money and effort, particularly in building trust between communities and outsiders. Participatory methods such as increasing dialogue and discussion between disaster managers and the community are receiving attention as a method to increase the effectiveness of community participation efforts. Dialogue involves not just an increase in education and awareness, but the chance for community stakeholders to be able to ask questions and be involved in discussion and debate of all issues.

For community involvement to be an effective part of disaster risk management a flexible and balanced approach is required. Young (1998) writes that practical approaches disaster risk management should build on both the technical know-how of professionals and the knowledge and perceptions of risk among the community. The establishment of disaster management plans that ignore local knowledge, political structures, cultural institutions, levels of awareness, local priorities and vulnerability are likely to be ineffective in achieving a sustainable management outcome at the local level. Similarly, purely participative approaches based solely on local knowledge and priorities are unlikely to produce effective management results (Young 1998).

The key to achieving the balance needed to gain effective community involvement in disaster risk management is the adoption of a flexible approach incorporating professional advice and active dialogue with the community members. Developing relationships with the community and actively engaging them in the disaster management process allows an insight into the cultural and social make up that make each community unique.

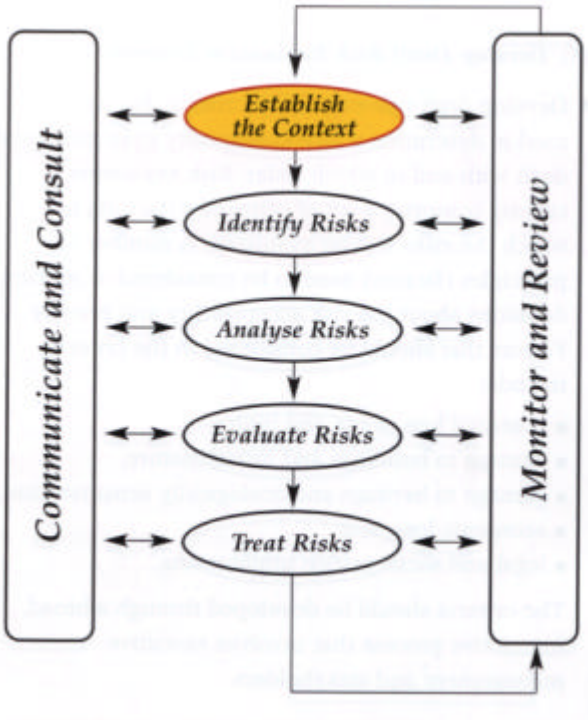
3 METHODOLOGY

The broad study design adopted by the McKinlay Shire for the Disaster Risk Management Strategy closely followed the Queensland Disaster Risk Management guidelines. This provides the opportunity to examine the effectiveness of both the community consultation adopted by the McKinlay Shire as well as the broader policy and guidelines.

3.1 Queensland Department of Emergency Services Disaster Risk Management Process

The Queensland Disaster Risk Management Guidelines provide a broad process for consultants and local governments to follow when conducting a Disaster Risk Management study. This structure is shown in the following figure and discussed below

Figure 2. Queensland Disaster Risk Management Structure



Source: Queensland Disaster Risk Management Guidelines 2000

✍✍ Establish The Context

The first stage of the process involves the description of the scope and nature of the study as well as outlining the range of issues that should be addressed to ensure the community safety and well being is considered in the process. This stage also identifies the strategic and organisational issues that are applicable to the process and the development of the project management framework.

✍✍ Identify Risks

This stage involves the examination of all hazard events with a realistic chance of occurring within the study area. Compilation and collection of the community and demographic data is also conducted to determine community needs and aid in the assessment of vulnerability. The vulnerability of the physical and natural environmental elements is also be listed and described.

✍✍ Analyse Risks

Involves the determination of the likelihood of the identified natural hazard risks and the analysis of the possible consequences associated with that event. During this stage the overall levels of risk for each natural hazard event is determined.

✍✍ Evaluate Risks

Evaluation of risks determines which risks are to be accepted and which risk will require further treatment. Risk must be prioritised in order of significance to determine which risks should be treated first.

✍✍ Treatment of Risks

The formulation of appropriate treatment strategies designed for the risks that will be treated.

✍✍ Communication, Consultation, Monitor and Review

While not one of the 5 main elements of the process, these communication, consultation, monitoring and review are one of the most important aspects of

successful disaster risk management strategy. They form a part of a feedback loop that continuously interacts with each of the 5 elements to ensure all issues and necessary measures have been taken to achieve an adequate level of community participation.

3.2 **McKinlay Shire Disaster Risk Management Process**

3.2.1 **Location**

The McKinlay Shire is located 800km West of the City of Townsville in Central Queensland. The shire is comprised of 1 main community centre, a number of smaller settlements and a vast expanse of rural land and properties. Julia Creek, the shire's main centre located at the approximate geographical centre of the Shire at the crossroads of the Flinders and Burke and Wills Highway.

Figure 3. McKinlay Shire Map

(See Overleaf)

Photo: Julia Creek Main Street (David Ireland 2001)

Photo: McKinlay Shire Council Depot (David Ireland 2001)

Photo: Eastern View from Julia Creek (David Ireland 2001)

Photo: Road Train (David Ireland 2001)

Photo: Dirt Roads in McKinlay Shire (David Ireland 2001)

Photo: Julia Creek Uniting Church (David Ireland 2001)

3.2.2 **Demography**

The McKinlay Shire covers an area of 44 000 square kilometres and has an estimated 2001 population of 1144 people (Goudie 2001). Approximately half the population is located in the town of Julia Creek while the other half is distributed among the smaller settlements and rural properties. The Shire has a transient seasonal population of musterers, jackaroos, branders and other hired hands who work on the cattle properties during certain times of the year.

The following table was derived from data collected in the 1996 Australian Bureau of Statistics Census.

Figure 4. McKinlay Shire Population Data

LOCATION	**POPULATION**
Julia Creek	600
McKinlay	30
Kynuna	20
Nelia	10
Rural Properties	515
TOTAL	1175

Australian Bureau of Statistics 1996 Census Data

The 1996 census results also indicated that there were 492 households within the Shire with an average household size of 3.1 persons.

The McKinlay Shire is economically dependent on the cattle industry. However, a number of other smaller industries are also present in the shire including agricultural pursuits, mining and some smaller commercial ventures.

3.2.3 **Infrastructure Description**

Julia Creek acts as one of the major service centres for the shire and is home to a state primary school, accommodation, council depot, library services, Queensland Emergency Services facilities, Rural Fire Brigade, small shopping facilities, hospital and a newsagent.

3.2.4 **Natural Hazards**

The McKinlay Shire has an average annual rainfall 463mm. Most of this falls during the summer monsoonal activity. As a result of this, the Shire is faced with periods of drought and heavy rainfall. The average annual temperatures of the Shires are 17^0C minimum and 33.1^0C maximum. The coldest month of year is July with temperatures averaging 26.1^0C with a minimum average of 8.4^0C. December and February are the hottest months of the year with highs averaging 38.5^0C and lows of 23.5^0C (Department of Primary Industries 2001).

The McKinlay Shire is faced with a variety of natural disaster events. These events include:

- Floods
- Sandfly infestations following flood events
- Bushfires
- Windstorms
- Severe Heat Waves
- Severe Cold Snaps
- Exotic Pest Invasions

3.3 **McKinlay Shire Disaster Risk Management Study Methodology**

The Methodology used in the development of the McKinlay Shire Disaster Risk Management Strategy was based on the on the structure outlined in the Queensland Disaster Risk Management Guidelines. While the guidelines provide a basic framework for disaster risk management, they do not define the methodologies that

should be utilised to obtain the required data. The guidelines are also designed to provide disaster consultants with enough flexibility to adapt the study to the constraints and limitations of specific areas.

The McKinlay study sought to identify the potential natural diaster risks that currently exist or may develop within the shire and use this information to identify all relevant stakeholders. Through extensive consultation with these stakeholders and members of the general community, disaster management and mitigation measures were outlined and their effectiveness assessed. The final part of the study considered the potential costs and benefits of these measures to ensure the best outcomes for the greater community were being achieved.

The Disaster Risk Management process used in the McKinlay Shire contained 4 main stages. The following table describes these stages, outlines the methodologies used in each stage and shows the link to the elements of the Disaster Risk Management structure outlined in the Queensland Guidelines (see overleaf).

Figure 5. McKinlay Shire Disaster Risk Management Process

Stage Number	Stage Name	Stage Description	Methodology	Related Queensland Guideline Element
Stage 1.	Identification of Natural Hazard Risks.	Involved the identification of the all hazard risks within the McKinlay Shire Study area.	Analysis of archival data and meteorological records. Community Interviews and Surveying.	Identify Risks
Stage 2.	Analysis of Disaster Risks to Community And Infrastructure.	Assessed the vulnerability of community and infrastructure.	Analysis of archival records. Community Interviews and Surveying.	Analyse Risks Evaluate Risks
Stage 3.	Development of Risk Management and Mitigation Strategies.	Development of management strategies and consultation to assess community support for strategies and prioritise actions.	5 Natural Hazard Impact Reduction workshops	Treat Risks
Stage 4.	Production of Final Strategy.	Collation of results and preparation of final strategy for McKinlay Shire Council.	Preparation of report	Treat Risks

3.4 **Study Methodology**

An examination of the McKinlay Shire Diaster Risk Management Process was achieved through examination of the process methodology, compiled reports, conducting informal interviews and discussions with Shire members, and work as a participant observer in the Natural Hazard Impact Reduction Workshops.

The McKinlay Shire Disaster Risk Management Study was conducted between January and August 2001. As the methodology was based on the Queensland Disaster Risk Management Guidelines, the applicability of this structure was also assessed during the process.

The consultation methodology adopted for the McKinlay Shire study was performed during the first 3 stages of the process and utilised surveys and interviews in stages 1 and 2 and workshops during stage 3. An examination of the effectiveness of the consultation methodology was achieved through the examination of survey material and interview results as well as participation in the Natural Hazard Impact Reduction Workshops.

There were 5 Natural Hazard Impact Reduction Workshops conducted for the McKinlay study. These workshops were held between the 28th of April and the 2nd of May 2001. An examination of the effectiveness of these workshops was enabled through participation in the running of the workshops, observation of their operation, discussions with consultants and participants and examination of the workshop outcomes.

An analysis of the possibilities to incorporate Disaster Management into Local Shire Planning was achieved through the examination Queensland's principle planning legislation, the *Integrated Planning Act, 1997*. As a requirement of Act, each Local Government is preparing a new Planning Scheme. An analysis of the possibilities to incorporate Disaster Risk Management actions within the land use policies contained in these schemes was achieved through participation in the preparation of the City of Thuringowa Planning Scheme, in particular the Natural Hazard City-Wide Code.

4 RESULTS

4.1 Consultation Methodology

Community involvement as stated in the Queensland Disaster Risk Management Guidelines plays an important part in achieving successful management outcomes. The benefits of effective community consultation to the risk management process, as discussed include raising awareness, utilisation of local knowledge, increased preparedness, greater community support and the development of a sense of public ownership.

The McKinlay Shire Disaster Risk Management Study incorporated a high level of community involvement activities throughout the process and utilised a range of consultation methodologies including surveys, interviews, public workshops, council meetings and informal discussions and dialogue with community members.

4.2 Effectiveness of Consultation Methodology

4.2.1 Surveys and Interviews

Stage 1 and Stage 2 of the McKinlay Shire Disaster Risk Management Study involved the surveying and interviewing of key stakeholders and community members within the shire including property owners, councillors, rural fire brigade representatives, police and members of the community who had experienced disasters first hand. The open-ended surveys addressed the identification of natural hazard risks as well as questions concerned with community vulnerability to disaster events. Survey recipients were also asked to comment on their support for possible management and mitigation actions.

During the consultation period for the first two stages of the McKinlay Study, 31 of these interviews were conducted with individuals that included a joint interview with council members. The number of interviews conducted represented 2.7% of the Shires population. Of the surveys group, approximately 80% were male resulting in gender bias of 4:1. While such as gender bias may have a bearing on the validity of scientific results, the intent of the surveys, that is to identify natural hazard risks will not be determined or affected by gender.

4.2.2 **Effectiveness of Surveys and Interviews**

The information obtained from the interview and surveying techniques utilised in the first two stages of the process was compiled and compared with historical data and meteorological data to determine all natural hazards with a realistic chance of occurring in the shire. This methodology proved successful and acquired the necessary information for the first two stages of the McKinlay Study and complete the Identify and Analyse Risks elements outlined in the Queensland Guidelines.

The survey and interview techniques also allowed a compilation of possible risk management and mitigation measures that were used to formulate the draft disaster management strategy. While response rates to the interviews were good, some of the respondents indicated that they would not take part in the workshop activities as they had already contributed and could not afford the additional time to commit to workshop activities.

4.2.3 **Natural Hazard Impact Reduction Workshops**

Stage 3 of the McKinlay Study incorporated a more participatory approach to community involvement. Using structured workshops, community members were asked to indicate support for possible disaster management actions and prioritise these actions based on the urgency of need to the community. The Natural Hazard Impact Reduction Workshop material and results are included in Appendix 1 and 2.

There were five community workshops conducted between the 28th of April and the 2nd of May 2001. The workshops were situated in 5 different parts of the shire to allow greater access for all members of the community. In this respect, workshops were held in Julia Creek, Kynuna, Nelia, McKinlay and Sedan Dip. The location of each of the workshops is shown in Figure 3.

The structure of the workshops involved group participation in a number of task associated with impact reduction and possible disaster management activities. The group format was used to encourage discussion of the issues and drive consensus for the issue being debated.

The first section of the workshop required the groups to work through a prepared form and show the groups support for possible disaster management and mitigation actions. Once the first task was completed, the groups were encouraged to prioritise the supported management actions and rank the top ten in terms of their urgency. The final list and the issues raised were then presented by a chosen group leader and recorded by the disaster management team and displayed using a data projection screen to ensure the proper meanings of each speaker were being recorded.

The second task completed during the workshops was the graphical identification of potential risks on a topographic map of the shire. This task involved workshop members identifying flood heights during seasonal and major flood events, fire ignition points, past sites of wind damage and impassable roads during flood events. Participants were also encouraged to identify permanent water available for fire suppression and all weather landing strips for small aircraft.

4.2.4 **Effectiveness of Natural Hazard Impact reduction workshops**

4.2.4.1 **Attendance**

The total attendance to the Hazard Impact Reduction Workshops is shown in the following table.

Figure 6. Workshop Attendance Figures

Workshop	Location	Participants
1	Julia Creek	6
2	Nelia	5
3	McKinlay	6
4	Kynuna	7
5	Sedan Dip	0
Total Number of Participants		21

The Natural Hazard Impact Reduction Workshops were poorly attended by the McKinlay community with only 1.84% of the Shires' population participating. The reasons for the low attendance can only be speculated but a number of factors can be identified as contributing to the low level of participation.

4.2.4.2 **Advertising**

Advertising of the Hazard Impact Reduction Workshops was the designated responsibility of the McKinlay Shire. Advertising of the workshops was anticipated to appear in the local newsletter, regional newspaper and broadcast on local radio in the days leading up to the first workshop. The workshops were also intended to be advertised through informal communication lines including community notice boards, the Country Women's Association and word of mouth.

However, this level of advertising was not achieved and the workshops were not promoted in any from of the written media and relied heavily on the informal communication lines to inform people of time, location and reasons for the workshops. The interview on ABC radio was conducted as scheduled the day before the first workshop.

The limited advertising would have contributed to a low awareness of the workshops and resulted in fewer participants. A majority of the community members who did take part in the workshops indicated that they were made aware of the workshops through informal communication means.

4.2.4.3 **Loss of Ownership of past Workshops**

In spite of the clear lack of formal advertising of the workshops, the low level of community participation may also be attributed to a range of factors. A workshop participant expressed the view that the low level of attendance may be attributed to a general sense of a loss of ownership of past workshops and a perceived inability to affect the outcomes of the management actions being debated.

This problem has been identified in the past and been linked to the perceived gap between technical experts and the community. Many authors acknowledge the wide spread use of top-down methodologies within disaster management has contributed

to a loss of ownership of past community involvement activities (Fordham 1999, Twigg 1999).

This problem is further exacerbated when community members can not see that there are any benefits that will come out of the process or, that their ideas will ever be implemented at a ground level. This view was also expressed by a number of workshop participants and may contributed to the sense of loss of ownership of past community involvement actions.

4.2.4.4 **Individual Resilience**

The McKinlay Shire Risk Identification report indicates that residents know the forces of nature can not be stilled and accept that floods, bushfires, severe windstorms, heat waves, cold snaps and insect plagues are part of life in North-West Queensland (Goudie 2001). Most adults within the shire will have first hand experience with natural hazard events. As a result of this, the community understands that the prevention of controllable risks, preparation against foreseeable damage, responses to help ones self and others, along with focused recovery efforts from the impacts of natural disasters all help to minimise loss and disruption to normal life.

While this high level of awareness sets the McKinlay Shire community in good stead to contribute to the disaster risk management process it also creates ambivalence to management efforts and community involvement activities. A number of the workshop participants expressed the opinion that they had coped with disasters for a number of generations and had taken sufficient precaution to negate the effects of hazard impacts without the preparation of a Diaster Risk Management Strategy. However, post disaster studies conducted by the Centre for Disaster Studies in North Queensland have all recorded a level of surprise and disbelief on the part of victims who did not anticipated the severity of the predictable disaster events (King 2000).

4.2.4.5 **Workshops Location**

Many of the workshop participants indicated that they were thankful of the varied locations of the workshop throughout the McKinlay Shire. In spite of this, other participants highlighted the fact that they and some of the people who were not present were still faced with a great travelling distance (in some cases greater than 100km) to participate in the workshops activities. Participants also indicated that the

nature of the rural industry limited the amount of free time to participate in the workshop activities. It was also suggested that some members of the community who were not present but wanted to be involved could not afford the time (travelling and participation) to participate in the workshops.

4.2.4.6 **Duration of Workshops**

The formal section of the Hazard Impact Reduction Workshops was scheduled to take approximately 2 hours. This time was sufficient to achieve the activities and determine the outcomes of each workshop and maintain focus on the task at hand. However, some of the best information gathered was obtained during a time of informal discussion following the workshops. The structure and duration of the McKinlay Shire Disaster Risk Management Study enabled ample time for informal discussion which proved to be a valuable tool for gaining extra information, seeking personal opinions, raising awareness and developing relationships between disaster consultants and the McKinlay Shire community.

4.2.4.7 **Workshop Structure**

The structure of the workshops as described earlier in the chapter proved successful in terms of achieving the desired outcomes. This was facilitated by a clear demonstration of the tasks by the consultants and a reiteration of instructions as each group completed the previous activity.

Most of the workshop groups were able grasp the concepts and activities placed before them and work independently to complete the tasks with ease. The workshop conducted at McKinlay had the most trouble completing the activities and needed to be guided through the rating and prioritisation of the possible management activities by the consultants. While this was a necessary course of action it may have introduced some bias to the results recorded in the McKinlay workshop.

4.2.4.8 **Group Size**

As a result of the limited participation in the workshops, the individual groups were also relatively small. Although most of the workshops ran well and all participants made a contribution towards the outcomes, some of the workshops were driven by the more educated and eloquent members of the group. These people were able to

clearly express their views and achieve a heavy influence on the prioritisation of the management actions. This was particularly noticeable in the Julia Creek workshop where a property owner played a dominant role in throughout the workshop.

With the exception of the Julia Creek, the male participants generally controlled the workshop activities. The nature of the workshop activities and the topics being discussed would not have been greatly affected by male dominance, rather this observation reflects traditional social constructs that are present in Australian rural areas.

4.3 **Issues for Disaster Managers and Consultants**

The McKinlay Shire Disaster Risk Management process highlighted some issues that are present within remote shires that will have a bearing on both the consultation strategies used and the implementation of disaster management actions. These issues have the potential to greatly affect the success or failure of disaster risk management activities in remote shires.

4.3.1 **Local Government Support**

The level of Local Government support for disaster management activities can have a great impact on the success of community involvement activities and the implementation of management objectives. A high level of Local Government support can be beneficial in terms of devoting increased time and resources to the study, contribute actively to participation efforts and encourage the community to become involved in the management process.

Conversely, a low level of local government support can lead to the discouragement of participation in consultation initiatives, limited implementation of strategy outcomes and recommendations, and the introduction of political biases that place weight on certain aspects of the study to fulfil political agendas.

4.3.2 **Local Government Resources**

Creating and implementing a successful Disaster Risk Management strategy can be an expensive task. In some rural areas, where emergency management resources are limited, the funding of disaster management projects can become a major

challenge (Friez 2000). Remote shires characterised by a small and sparse population often struggle in terms of the allocation of resources for funding as a result of limited staff and a small rate base. As a result of this, remote shires are more dependent on government funding and project grants and may not be able to implement the more expensive management outcomes.

4.3.3 **Community Loss of Ownership**

Public participation has become a common factor within the construction and implementation of public policy, legislation and environmental management programs in Australia. This movement was aimed at enabling the community to have an increased level of participation in the planning process and affect the decisions that would impact on their lives. However, as a result of expense associated with increased participation requirements, community involvement efforts are often limited to top down methodologies where the community is seen as a one-way information source and not as a partner with a valid contribution to management outcomes. This approach has been referred to as rubber stamp participation that fulfils legislative requirements to the minimum degree (McDonald 1999).

As a result of the increased number of community involvement activities, the reliance on top down methodologies and the failure to adequately involve the community, there is a sense of loss of ownership of community participation efforts and an unwillingness to participate in future efforts. This feeling was present within the McKinlay Shire with a number of workshop participants indicating that they felt a loss of ownership from previous community involvement programs.

This sense of a loss of ownership may have contributed to the low level of participation experienced in the Natural Hazard Impact Reductions Workshops. A workshop participant commented during the Julia Creek Workshop that people may have been turned off community participation because of the loss of ownership and the perception that they have been ignored during past workshop and community involvement strategies.

4.3.4 **Local Resilience**

Natural hazards are a “way of Life” in many regions of Australia (May et al 1994). To a large extent, natural disaster events are an ingrained in the psyche of members of

the Australian outback who have developed a high level of individual resilience to the impacts of disaster. Resilience describes the capacity of systems to maintain their integrity, relationships and balance between elements in the presence of significant disturbances (Paton 2000).

Historic outback literature describing the Australian environment is quick to highlight the presence of disaster events and the local resilience to their presence.

"*I love a sunburnt country, a land of sweeping plains, of rugged mountain ranges, of droughts and flooding rains." - Dorothea McKellar – I Love a Sunburnt Country*

There is a noticeably high level of individual resilience in the McKinlay Shire. This is the result of a variety of factors that have encouraged a culture of individual resilience and independence in the face of disaster events. Most adults in the shire have had experience with the range of natural disasters. A common expression used in various forms by McKinlay residents is that 'disasters, wether bushfire, floods or wind are a natural part of life; you deal with it as best you can and get on with it'.

Disaster events within the region are also a common and somewhat predictable event. Localised flooding occurs almost on a yearly basis with wide spread flooding recorded on an average of once every four years (Goudie 2001). Bushfires are also predictable and are most common in the dry months following the wet season. The frequency of disaster events requires that individuals take the necessary precautions to reduce the impacts of disasters and the results in effective individual management.

Furthermore, the large distances between homes and emergency services, supplies and medical facilities encourages individuals to take the necessary steps to reduce the impact of disaster events in case they can not access community facilities and infrastructure. As a result of these factors, individual resilience to natural disaster is very high. People generally take the necessary precautions to ensure their family and property are protected from disaster events.

While this is clearly a benefit to the awareness and implementation of disaster management objectives, it may also contribute to a low level of participation in community involvement as people believe they have taken all appropriate measures to prepare themselves for disaster events.

4.4 **Recommendations for Remote Shire Disaster Risk Management Study Designs**

The McKinlay Shire Study highlighted a number issues that should be addressed to create a successful community involvement methodology for Disaster Risk Management in a Remote area. These recommendations are simple but can dramatically increase the success of community involvement techniques and enhance the role the community will play in the management of disaster risks.

✍✍ Develop Trust and Dialogue

Dialogue involves conversation debate and the formation of relationships with the community in a manner that allows participants to express their views and participate openly in the study. For this to occur, a high level of trust must be developed between the consultant and the community.

There is some feeling of apprehension toward outsiders in remote areas and a belief that, in general, consultants generally do not know enough about the region in which they are working and therefore study outcomes are likely to be inapplicable to the local situation. This barrier is more likely to be broken down by a consultant or manager who has spent ample time with the community and developed personal relationships with its' members.

✍✍ Advertise Effectively

Advertising of the study program, activities and purpose of community involvement should be conducted using both informal and formal communication lines. Informal communication lines such as notice boards, community based organisations and newsletters have the potential to reach a much greater audience than some traditional advertising mechanisms such as newspaper and radio. The identification of all communication avenues should be performed earlier in the study to ensure maximum exposure of community involvement activities. If the advertising of consultation activities is left to the Local Government, the researcher should ensure that an adequate level of advertising is being achieved.

✍✍ Spread the Location

The great distances that separate community members in remote shires can result in high travel and time costs for participants in community involvement activities. To reduce these costs for community members, and to enhance participation opportunities, the location of activities should be spread throughout the study area.

The personal interviews and surveys conducted during the first stage of the consultation methodology within the McKinlay study demonstrated that adopting this methodology could achieve high response rate and an excellent source of data. However, personal interviews conducted in the homes of participants are generally a more time consuming and expensive process.

Another method of reducing travel costs and enhancing participation is to align the community involvement activity with other events that draw people from the wider community into the service centres such as local shows, festivals or church.

✍✍ Simplicity Provides the Best Results

Community involvement activities should be simple and succinct in nature. Participants will provide more honest answers when they have a clear understanding of the task at hand. Minimising the duration of activities will also result in improved participation as people can remain focused and not be concerned about the length of the activities.

✍✍ Clearly Define Role and Outcomes

The purpose of the consultation activity, how it fits within the disaster risk management process and the extent to which the outcomes of the involvement will contribute to final management recommendations should all be clearly described to the participants. This enhances participation effort and reduces confusion relating to the final results and implementation of the strategy.

✍✍ Embrace Local Knowledge

There is a wealth of local knowledge in remote rural Queensland. Much of the information required for successful disaster management such as hazard mapping,

and risk identification is not documented but preserved in the mental maps and minds of community members. Encouraging community members to divulge this information can very valuable as in many case it has been passed down through generations and outdates formal records and archived material.

4.5 **Chapter Summary**

The Queensland Disaster Risk Management Guidelines provide a detailed framework on which to build an effective Diaster Risk Management study. The McKinlay process has proved that a study based on the Queensland guidelines can be easily utilised to identify and analyse disaster risks, provide treatment strategies and lead to the creation of effective Disaster Risk Management outcomes.

The Queensland guidelines promote and enable the flexibility required to conduct and create a management strategy that is specific to the constraints, limitations and opportunities of the study area. The flexibility of the guidelines is clearly outlined within the description of the basic elements of the Disaster Risk Management Process. The Guidelines indicate that their purpose is not to be regarded as a standard, but as a guiding framework that can be used to develop an appropriate process that is responsive particular circumstances (Zamecka & Buchanan 2000). Throughout the guidelines, this is demonstrated through the use of broad descriptions of processes and suggestions for management actions rather than requirements.

As a result of this flexibility, it is left in the hands of the consultant or disaster managers to develop a study design that is appropriate for the specific study area. This includes the wider study context and individual elements including the consultation strategy. The guidelines also indicate that good communication between consultants, managers, external agencies and the community is a feature of successful Risk Management activities (Zamecka & Buchanan 2000).

While not prescribing detailed methodologies for community involvement the guidelines do indicate that the consultant and managers should:

- identify the aims, objectives and timeframes for community involvement activities;
- identify the internal and external participants;

- determine the most suitable methods of consultation;
- document the results of consultation activities;
- include the results in the decision making process; and
- provide feedback to participants.

These steps provide consultants with the basic framework required to conduct a successful community involvement strategy without restricting the freedom to implement appropriate methods that are best suited to the study area.

The structure of McKinlay Shire consultation strategy was aimed at achieving a high level of community involvement throughout the study. The survey and interviewing technique utilised during stage 1 and 2 of the process provided excellent results concerning the identification of disaster risks within the Shire and a made the preliminary description of management and mitigation activities possible. The surveys conducting at rural properties in Shire had high travel costs but delivered quality information and demonstrated to the community the desire of the consultants to gather input form all sectors of the McKinlay Shire. Actions such as these helped develop personal relationships between consultants and the community and were fundamental to the development of trust and dialogue demonstrate during the later stages of the process.

The Natural Hazard Impact Reduction Workshops were aimed at utilising a more participative approach to community involvement than the surveys and interviews conducted during the first 2 stages. The workshops were designed to drive discussion and robust debate between workshop participants and come to a consensus concerning the final outcomes of each of the workshop activities. The design of the activities was successful in that participants became involved in constructive debates concerning the possible treatment options yet were able to present a final result with the backing of all participants.

The structure of the workshops also achieved some of the secondary benefits associated with effective community involvement. These included: increased awareness of disaster risk and management possibilities, the formation of useful relationships between disaster managers and community members and the generation of increased interest in the management of disaster risk within the Shire.

The mapping exercise proved to be a successful activity to physically record the local knowledge of disaster events in the Shire. While mapping of disaster events, such as floods and fires, has never been performed for the area, the information is stored in the mental maps of community members. Workshop participants tended to be more confident when mapping flood heights rather than other disaster events which were recorded on the map in a more general fashion.

In spite of these benefits, the workshops were limited in terms of their representation of the McKinlay Shire community. The low level of participation may be contributed to variety of factors discussed earlier including ineffective advertising, loss of ownership, high levels of individual resilience, high travel costs and earlier participation in surveys and interviews conducted in stages 1 and 2. Some small alterations to the preparation of the workshop activities may have resulted in an increased level of participation and a more representative sample. However, the information provided by the workshop participants, combined with the data gathered earlier was sufficient to complete the study and compose a Disaster Risk Management Strategy in accordance with the Queensland Disaster Risk Management Guidelines.

5 INCORPORATING DISASTER RISK MANAGEMENT INTO SHIRE PLANNING

5.1 Land use Planning for Disaster Management

Natural hazards and disaster events are a very much part of the natural workings of the earth and are not problems in and of themselves (Geis 1996). However, these hazards do become a problem when they impact on human settlements and provide a dramatic demonstration of people living in conflict with their environment (Centre for Excellence for Sustainable Development 2001). The severity of the impacts associated with natural disasters is greatly affected by the appropriateness of the built human environment and our settlement patterns (Geis 1996).

Land use planning is increasingly recognised as a tool that can be utilised to incorporate disaster management into Local Government planning. Land use planning is concerned with the spatial location, extent and composition of the built environment. Traditionally, local mitigation and disaster management activities have taken the form of stronger building codes, stricter code enforcement, new construction methods and materials, and public education programs. While these actions are beneficial in terms of disaster response, land use planning has the ability to reduce community vulnerability and the economic impacts associated with disaster events through proactive measures (Devlin 1998). Where building codes consider the built environment as a series of individual structures, land use planning considers structures within the context of the community and regulates their location, siting and proposed uses to create a more appropriate and disaster resistant human environment.

Land use planning and the management of new development show potential for reducing societal vulnerability to natural hazards and for bringing about more sustainable communities (Land Use Planning for Sustainable Communities 1997). In spite of the clear benefits that can be obtained through land use planning, Devlin (1998) indicates that rarely has it been at the forefront of disaster management efforts.

'Project Impact' is a Federal Emergency Management Agency (FEMA) initiative used to create disaster resistant communities in the United States. Project Impact achieves this aim through encouraging and supporting the local communities to adopt actions that reduce disruption and loss as a result of disasters (FEMA 2000).

Many ‘Project Impact’ communities have found success in achieving this aim through the adoption of disaster management principles within land use planning policies. Planning in North Dakota, initiated over 20 years ago, has demonstrated that land use planning for disaster management can achieve economically and socially measurable success. It is estimated that US $45 million dollars of damages was prevented during flood events in 2000 as a result of actions by individuals, businesses and local state and federal partners in a clear demonstration that mitigation planning can work (Friez 2001).

Similarly, a 1996 FEMA study estimated that Oregon saves about US $10 million a year in flood losses because of strong land use planning policies. These benefits were obtained through the implementation of a local land use plan 25 years ago that included inventories, policies, and ordinances to guide development in hazard areas thereby reducing the losses from flooding, landslides, earthquakes and wildfire (Oregon State Wide Planning Effort 1997). In this regard, developments with a high risk of damage or that could result in the loss of life were not allowed to be located in known hazard areas without appropriate safe guards.

Land use planning for disasters is based on mapping the extent and impacts of natural hazards and designing policies accordingly. The use of Geographic Information Systems to map hazards and community vulnerability is an emerging field. As a result of this, land use planning for disasters can be extremely data intensive depending on the range and severity of hazard events affecting the study area. Disaster studies conducted in remote Shires of North Queensland have found that the availability of hazard mapping is often limited (Centre for Disaster Studies 2001). Collection and collation of the required data can be an expensive and time-consuming process.

Queensland’s Integrated Planning Act 1997 (IPA) which commenced on 30 March 1998, is designed to facilitate the coordination and integration of planning at a local, regional and State level to ensure that balanced ecological, economic and social outcomes are achieved for future development (Cawood *et al* 1999). Planning Schemes that are being prepared in accordance with IPA are enabling Local Governments to implement disaster management and mitigation recommendations as well as incorporate them into local strategic planning and development assessment. The State Governments support for such actions is demonstrated

through the of a possible development of a State Planning Policy to make such actions a statutory requirement for all Local Governments.

5.2 State Planning Policy on Land Use planning for Natural Disaster Mitigation and Development Assessment

Disaster Risk Management is currently an initiative promoted by the State Government and taken on board by some proactive councils. However, the preparation of a new State Planning Policy on Land Use Planning for Natural Disaster Mitigation may soon require all Local Governments to undertake some form of disaster planning.

A State Planning Policy is a statutory planning instrument that is developed under Queensland's principle planning legislation, the *Integrated Planning Act* 1997. A State Planning Policy addresses matters that must be considered when making planning decisions at a State and Local Government level. If adopted, the Natural Hazards State Planning Policy will describe the State's position on development and land use planning issues within areas susceptible to hazards including cyclones, flooding, landslides, bushfires, severe storms and earthquakes. The State Planning Policy will also play a key role in the creation of new planning schemes in each local government area in accordance with IPA.

The State Planning Policy may require local governments to perform a variety of actions to incorporate hazard mitigation and disaster management within all aspects of Local Government planning. It is anticipated that each local government area will identify and map hazard prone areas from which appropriate planning measures can be created.

These planning measures can be incorporated into the IPA planning schemes in a number of ways including Desired Environmental Outcomes that articulate the preferred end state desired by the community and the development of specific planning codes.

Planning schemes may also be required to apply appropriate planning policies, development standards and performance criteria to identified hazard prone areas. Some proactive Local Governments have already addressed natural hazards within

their draft IPA planning schemes and successfully incorporated planning area codes to control development within hazard prone areas.

A further requirement of the State Planning Policy may result in each Local Government undertaking a Disaster Risk Management Strategy to adequately identify risk, assess vulnerability and prescribe disaster management and mitigation measures that may be adopted.

5.3 **IPA Planning Schemes**

As a requirement of the *Integrated Planning Act* 1997 each local government must prepare a new planning scheme in accordance with the new legislative guidelines. All Local Government planning schemes are to be completed by 2003.

Schedule 1 section 4.(1) of the Act identifies the core matters for the preparation of a planning scheme. The core matters include, land use and development, infrastructure and valuable features. While disaster management or natural hazards management is not specifically addressed within the core matters it is not discounted either. The definition of land use and development contains reference to development constraints (including, but not limited to, population and demographic impacts). Natural hazards and disaster risk can be included within this definition of land use and development and can therefore be legally incorporated within IPA planning schemes.

IPA planning schemes present an excellent opportunity for local governments to assess vulnerability to natural disasters and develop planning measures to ensure that new development does not lead to and increase in community vulnerability. The preparation of draft planning schemes in certain local government areas has demonstrated the ability of local governments to effectively incorporate disaster management within IPA planning schemes.

✍✍ Desired Environmental Outcomes

Disaster management can be addressed in IPA planning schemes through a variety of planning mechanisms. The Desired Environmental Outcomes (DEOs) are a key element of all planning schemes (s 2.1.3.(1) *IPA* 1997). The DEOS articulate the

desire future or end state for the Local Government area and create the strategic direction or goals for the area.

Community vulnerability and safety can be incorporated within planning schemes as a DEO. The City of Thuringowa Draft Planning Scheme DEOs contain reference to the provision of a safe pattern of development that minimises the potential risk to people and property from: storm surge, flooding, steep and unstable land, bushfire, acid sulphate soils, contaminated land, salinity, land degradation, and technological hazards. The DEOs form the base on which the rest of the planning scheme sits and requires Council to assess how each development will contribute to the achievement of these preferred outcomes.

✍✍ Natural Hazard Codes

The most effective way that natural hazards management can be incorporated into IPA planning schemes is through the creation of specific planning requirements that deal with natural hazards and community' vulnerability. The City of Thuringowa has prepared a Natural Hazards Code as part of its IPA planning scheme.

The Code utilised a variety of sources of information to construct a comprehensive hazard map that clearly defines all hazard prone areas within the local government areas. Any development occurring within these zones is then subject to more rigorous planning requirements to ensure that the development does not contribute to an increase in community and personal vulnerability. An example of this is the flooding section of the natural hazards code which is aimed at ensuring a level of flood immunity such that habitable areas are not inundated by a 50 year ARI flood event. The code also seeks to ensure that any development will not contribute to the worsening of flood conditions on site or elsewhere within the catchment.

5.4 **Chapter Summary**

The preparation of State Planning Policy may soon require all Local Government Areas to incorporate disaster management in local land use planning. To achieve effective land use planning outcomes, natural hazard policies must be based on accurate data that defines the spatial extent and distribution of hazards. This data may include topographic information such as land elevations and geomorphology, flood heights and water flow directions, bush fire paths, acid sulphate soils, degraded

land and storm surge heights. Mapping this data allows planners to consider impacts of hazards on strategic planning outcomes and site development more appropriately. Obtaining this information is likely to be expensive and may not be possible in some of the remote and rural shires.

While land use planning for disaster management provides some clear benefits to reducing community vulnerability it is often implemented using top down methodologies and does not achieve the secondary benefits associated with a more participative approach such as the formulation of a Disaster Risk Management Strategy. Land use planning should therefore be regarded as a tool that can be utilised to effectively implement some of the outcome of the broader Disaster Risk Management Process.

6 DISASTER RISK MANAGEMENT AND REMOTE SHIRE PLANNING

Adopting a participative approach towards community involvement strategies in Disaster Risk Management has received much support in the literature. A participative approach enables researchers to gather the required information for the study as well as achieving a number of secondary benefits. These benefits can include increased awareness of disaster risks, greater understanding of management and mitigation options, the development of useful relationships between community members and disaster managers, a feeling of ownership of the study results, and greater long-term support for management outcomes.

An analysis of the effectiveness of the Community Involvement strategy adopted for the McKinlay Shire, Disaster Risk Management Strategy highlighted some issues that can have a great bearing on the success or failure of disaster management activities in a remote shire. These issues included a strong feeling of individual resilience, a sense of loss of ownership of past consultation activities, Local Government support and high travel costs to participate in consultation activities. Although these issues can be a stumbling block for disaster risk management activities in remote shires, they can be managed through simple alterations to study methodologies and effective implementation measures. The Queensland Disaster Risk Management Guidelines have acknowledged the need for flexibility in study designs and placed the onus on disaster managers and consultants to design an appropriate study based on the framework provided.

While the preparation of a disaster mitigation strategy is a ‘bottom up’ process that gives ownership to the community and increases levels of awareness, land use planning provides a top down reinforcement of the need for mitigation while collating and mapping hazard zone information. Land use planning has emerged as an option that can be used to implement disaster risk management and mitigation actions through the appropriate siting, and application of building standards to new development. To achieve effective land use planning for disaster events, planning policies must be based on reliable hazard mapping. The availability and accessibility of this information may hinder the development of land use planning policies in remote Shires. Many Shire’s do not have the resources to conduct the required scientific studies to formally collect this data. However, as demonstrated by the mapping exercise conducted during the workshops for the McKinlay Shire Disaster

Risk Management Strategy, this information does exist in the mental maps of community members.

While land use planning has proved to be successful in terms of reducing community vulnerability and the economic impacts of natural disasters, the top down nature of policies may not gain the secondary benefits that can be obtained through a more participative Disaster Risk Management Strategy. Land use planning should therefore be regarded as a useful tool to supplement Disaster Risk Management outcomes.

Conducting a Disaster Risk Management Strategy that utilises a participative community involvement methodology can maximise the benefits obtained from the process. Land use planning tools such as planning codes prepared within IPA planning schemes can then be used to implement appropriate planning measures for disaster management within the Local Government statutory planning environment.

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Legislation

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State Counter Disaster Organisation Act, 1975 (Queensland)

Internet Resources

Emergency Management Australia
www.ema.goc.au

Integrated Planning Act 1997 (Queensland)
www.ipa.Queensland.gov.au

Natural Hazards Center at the University of Colorado, Boulder
www.colorado.edu/hazards

State Counter Disaster Organisation (Queensland)
www.disaster.Queensland.gov.au

Project Impact
www.fema.gov/impact

Federal Emergency Management Agency
www.fema.gov

8 APPENDICIES

Appendix 1 McKinlay Shire Natural Hazard Impact Reduction Workshops Material

Appendix 2 McKinlay Shire Natural Hazard Impact Reduction Workshops Results