

AUSTRALIA

EMERGENCY MANAGEMENT AUSTRALIA

CONTENTS

1. INTRODUCTION [*](#)
2. NATIONAL ARRANGEMENTS [*](#)
3. AUSTRALIAN DISASTER REDUCTION MEASURES [*](#)
 - 3.1. Emergency/Disaster Legislation and Plans [*](#)
 - 3.2. Emergency Management Training [*](#)
 - 3.3. Exercises [*](#)
 - 3.4. Public Awareness [*](#)
 - 3.5. Research [*](#)
 - 3.6. Future Developments [*](#)
4. REGIONAL ASSISTANCE WITH DISASTER REDUCTION [*](#)
 - 4.1. International Decade for Natural Disaster Reduction [*](#)
5. Australia's Expectations of the Asian Disaster Reduction Center [*](#)
6. Major Natural Disasters Since 1990 [*](#)

1. INTRODUCTION

Under the Australian Constitution, the eight States and Territories have direct responsibility for the protection of lives and property. Accordingly, they maintain well-developed emergency management capabilities and have arrangements to meet their responsibility.

The Commonwealth (Federal) Government accepts responsibility for providing national disaster management leadership and standardisation. It meets this responsibility by developing policy; by supporting the State and Territory Governments in developing their disaster management capabilities; by providing assistance in the response and recovery stages after disasters; by providing warning and monitoring services for specific hazards; and by facilitating national training, public awareness and education, information management and research activities. The Commonwealth Government is also responsible for providing disaster management assistance to other countries.

Emergency Management Australia is the agency responsible for coordinating Commonwealth Government disaster management activities and, in conjunction with the Australian Agency for International Development (AusAID), for coordinating Australian disaster response and mitigation assistance to other countries. Details of Emergency Management Australia are given at Annex A.

For a number of years, disaster management in Australia has been based on four fundamental approaches:

- The **All Hazards Approach** - under which a single set of management arrangements are used to deal with the effects of all types of hazards.

- The **Comprehensive Approach** - under which a risk management approach to potential disasters is used to design the mix of strategies covering prevention, preparedness, response and recovery so as to provide the most effective disaster management structure.
- The **All Agencies Approach** - under which disaster management is seen as a partnership which requires the active involvement of all levels of government as well as voluntary organisations and the community itself
- The **Prepared Community** - under which it is recognised that the basis of successful emergency management is effective arrangements at community level. This requires an alert, informed and active community which supports its emergency services and voluntary organisations, complemented by an active and involved local government. All levels work within an agreed and coordinated set of arrangements covering prevention, preparedness, response and recovery.

Although for some years the emphasis in Australia was placed primarily on preparedness and response measures, there has been growing awareness in recent years of the links between disasters and development. This has resulted in recognition of the increasing importance of prevention, mitigation and reduction strategies. The International Decade for Natural Disaster Reduction (IDNDR) has played an important part in encouraging this change of emphasis.

2. NATIONAL ARRANGEMENTS

National coordination of emergency and disaster management activities is exercised through a National Emergency Management Committee. This committee, which is chaired by the Director General of Emergency Management Australia, includes the senior emergency management representatives of all States and Territories in its membership. This committee provides a valuable forum for Australia-wide endorsement of policy and arrangements and for discussion of a wide range of subjects. Specialist advisory groups have been established to study such subjects as communications, information technology, public awareness, training and education, and civil defence (as defined under the Geneva Conventions). A small Executive Group meets at regular intervals to examine practical issues. The committee has been meeting since 1993 and is beginning to have a significant impact on a national approach to disaster and emergency management in Australia.

3. AUSTRALIAN DISASTER REDUCTION MEASURES

3.1. Emergency/Disaster Legislation and Plans

Six of the States and Territories have enacted disaster management legislation. The Australian Capital Territory has draft legislation awaiting government consideration and Western Australia has administrative arrangements for emergency management and is currently examining options for legislation. All States and Territories have well-developed plans and procedures in place which are approved by respective peak emergency management committees; and these are supported by plans and arrangements at regional and at local government levels.

The Australian Government has decided that, because of the constitutional arrangements, there is no need for specialised disaster management legislation at the national level although emergency management issues are covered in other legislation. Many of these have an impact on disaster reduction including those dealing with:

- Environmental protection
- Hazardous waste
- Urban and regional development
- Quarantine
- Health
- Industrial development
- Natural resources management
- National water resources
- Primary industries

- Energy
- Social security
- Transport

Australia has a small number of plans which describe the Commonwealth response to domestic and overseas disasters. There are also national plans for dealing with specialised disasters which require the use of skills and resources from the whole country. These include plans for dealing with radioactive space debris, marine pollution and exotic animal diseases.

3.2. Emergency Management Training

Emergency management training is carried out on a national centralised basis by Emergency Management Australia. Additionally, significant training, especially of a practical nature, is undertaken by State and Territory agencies.

Training is based on agreed competencies which form the basis for national recognition of the qualifications of emergency management practitioners and for the development of training curricula which covers:

- Development of Emergency Management Policy
- Assessment of Vulnerability
- Selection of Emergency Management Strategies
- Planning of Strategy Implementation
- Implementation of Plans
- Effective Communication
- Management of People
- Management of Resources
- Coordination of Resources
- Management of Information
- Processing of Information
- Management of Training and Education
- Design and delivery of Training and Education

To allow emergency management practitioners to develop these competencies, new curricula are being developed which will cover all levels of training from the introductory level to tertiary level. The first courses to be affected by the competency standards are those currently delivered by Emergency Management Australia. The courses in Vulnerability Analysis, Evacuation, and Operations Centre Management are now competency based. Work is continuing on other courses.

It is anticipated that the development of these national competencies will have a significant impact on the capabilities of emergency managers and will improve national capabilities to reduce, mitigate and respond to disasters.

3.3. Exercises

Regular exercises are conducted at all levels of emergency management to validate plans and procedures and to reinforce training. A national exercise register is being developed to facilitate free exchange of experience and this will shortly be made available on the Internet.

3.4. Public Awareness

Traditionally, Emergency Management Australia has taken the lead in the design and production of a wide-ranging series of public education material in the form of pamphlets, posters and emergency manuals. This activity is now conducted on a national basis through a National Community Awareness Advisory Group which meets regularly to prepare strategies and share experience as well as advising the National Emergency Management Committee. Currently, the Advisory Group is studying the potential for wider use of the expertise available in the media, advertising and public awareness sectors to help the messages to penetrate the whole of society. The challenge in public awareness is to devise strategies which lead to changes in attitudes and behaviour. Significant success is being achieved in relation to reduction of forest fire vulnerability through the use of experienced facilitators working with community groups to identify the hazards and vulnerabilities which a community faces and assisting in the development of appropriate disaster-reduction strategies. The applicability of such an approach to a broad range of hazards is an area for further investigation

3.5. Research

Disaster-related research is conducted by various government agencies covering hazards such as bushfire, earthquake, cyclone. Research is also undertaken in various tertiary institutions around the country. The Australian Coordination Committee for IDNDR has funded the development of a research directory which will make information on the range of available research available to the-whole community. An area which has received insufficient attention in Australia is in relation to the social science aspects of emergency management. The IDNDR Committee has recently decided that it should be more directive in encouraging projects and research to meet identified gaps.

3.6. Future Developments

Australia is making a significant commitment to raising the importance of disaster reduction without reducing its disaster preparedness and response capabilities. This requires that a wider range of agencies and community organisations accept their disaster management responsibilities and contribute to the overall national capability. Government and business enterprises are also being encouraged to develop their own capabilities to continue their business when they have been affected by disasters or emergencies. The whole concept of risk management, as practiced in business, is seen as particularly appropriate to the emergency and disaster discipline. It is also one which has a terminology which will assist emergency managers to communicate more effectively with business and administration. Such improved communication is expected to encourage wider acceptance of, and involvement in, the aims of disaster and emergency management.

4. REGIONAL ASSISTANCE WITH DISASTER REDUCTION

The island countries of the South Pacific are at risk from a variety of hazards which cause regular disasters. While small on the global scale, these are major disasters for the countries affected with far more impact on national economies and development than more significant disasters in countries with larger resource bases.

Australia, as the largest developed nation in the region, has been a major provider of disaster response assistance for many years. Over the last 10 years it has also been making an increasing commitment to the provision of assistance with disaster-reduction measures. The Australian Agency for International Development (AusAID) has in place a Pacific Disaster Preparedness Program which has provided technical assistance, equipment and training to a number of regional countries using expertise provided by Emergency Management Australia and by non-government organisations.

In recent years AusAID has cooperated closely with the United Nations Department of Humanitarian Affairs in implementing a South Pacific Disaster Reduction Program. A recent change has seen the move of the South Pacific Disaster Reduction Program Office into the south Pacific Applied Geoscience Commission (SOPAC). The office has been redesignated as the SOPAC Disaster Management Unit and it will play a major role in coordinating disaster management activities within the South Pacific. Following the two recent major disasters in Papua New Guinea (the 1997/98 drought and the Tsunami in July 1998) AusAID is assisting Papua New Guinea to in strengthening its disaster management capabilities. by Emergency Management Australia is playing a significant role in this project. Although training has been provided in Australia for a number of countries by Emergency Management Australia, our preference is to conduct courses in the requesting country in conjunction with their officials so that requirements can be tailored more directly to local needs.

The Australian Government provides funding to the Asian Disaster Preparedness Centre in Bangkok and to specific non-government organisation programs which assist the development of national disaster management capabilities in other countries. Australia also provides funds for a number of development projects in various countries of Asia and the Pacific which have direct implications for disaster reduction.

Australia has a significant capability to respond to disasters in the Asian region. On a few occasions it has provided shelter materials and similar immediate response stores, but it is more frequently asked to provide financial or food aid to relieve immediate needs. In relation to the longer-term recovery period, Australia has provided significant assistance to Asian countries through development assistance projects. Where possible these are designed so that they reduce the vulnerability of the recipient country to disaster and enhance its recovery capability after similar future events.

4.1. International Decade for Natural Disaster Reduction

The Australian Coordination Committee for the International Decade for Natural Disaster Reduction includes government and non-government members, along with representatives of academic, scientific and community organisations. The committee, in line with the United Nations initiative, aims to reduce the loss of life and property damage caused by natural disasters, especially in developing countries.

Committee activities are guided by the Australian Strategic Plan developed in 1995 at a workshop involving participants from the emergency management community in Australia and the South Pacific and the United Nations. The Australian goals support international goals agreed by a United Nations General Assembly in 1989 and at the Yokohama World Conference on Natural Disaster Reduction held in 1994. The workshop identified reducing the vulnerability of community lifelines and promoting disaster education in schools as key areas upon which effort in Australia should be concentrated. The Committee provides funding for disaster reduction projects which help to achieve the goals of the decade. By 1998 it had provided over AU\$2 million as key areas upon which effort in Australia should be concentrated. The Committee provides funding for disaster reduction projects which help to achieve the goals of the decade. By 1998 it had provided over AU\$2 million for more than 120 natural disaster reduction projects in Australia and the South Pacific in the scientific, technical, educational, social and public awareness fields. South Pacific nations are a high priority for Australian IDNDR funding in keeping with the UN resolution and in addition to assistance in disaster management provided by Australia's Agency for International Development (AusAID).

Projects in the Pacific which have received IDNDR support include: funding for disaster training workshops; translation and printing of community awareness publications and disaster plans; and provision of computers on which to run sophisticated tropical cyclone prediction software. The program also initiated annual Pacific Regional Disaster Management Meetings of Pacific Island and Papua New Guinea disaster managers which provide an important forum for the exchange of ideas and regional cooperation.

Annex A

EMERGENCY MANAGEMENT AUSTRALIA

Country: **AUSTRALIA**

Name of Ministry: **DEFENCE**

Name of Department: **EMERGENCY MANAGEMENT AUSTRALIA**

Contact Information: **PO BOX 1020**

DICKSON ACT 2602

AUSTRALIA

Tel: **61 2 6266 5402**

Fax: 61 2 6257 7665

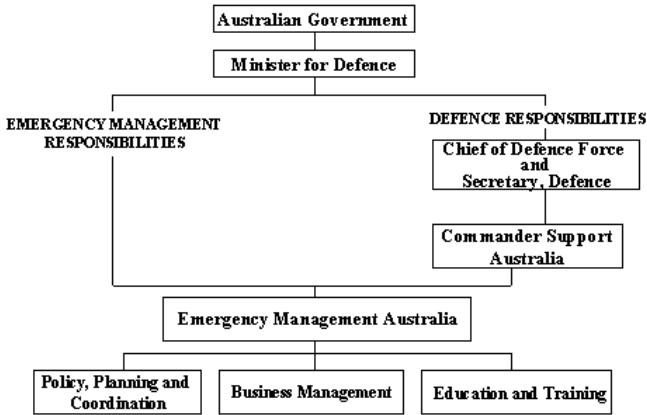
E-mail: ema@ema.gov.au

Homepage: www.ema.gov.au

Head of the department: Mr ALAN HODGES, AM

Number of employees: 60

Role: To reduce the impact of disasters and emergencies in Australia and its region.



Organisation:

Primary areas of responsibility:

- Enhancing national emergency management capabilities by:
 - developing Commonwealth Government and national emergency management policies, plans and programs;
 - developing national emergency management education and training curriculum and programs;
 - delivering emergency management education and training; developing and delivering emergency management information services;
 - generating and fostering community disaster-awareness in partnership with the Australian states and territories;

providing financial support for the development of state and territory capabilities.

supporting the development of Australia's civil defence capability;

developing emergency management doctrine which best describes best practice in all facets of emergency management; and

fostering emergency management research.

- Coordinating Commonwealth physical support to the Australian states and territories, and countries in Australia's region in times of disaster.
- Supporting the development of overseas emergency management capabilities, particularly in Australia's region of interest (in partnership with the Australian Agency for International Development).

Current major activities:

- Developing and strengthening national emergency management partnerships.
- Developing a national disaster-mitigation strategy.
- Identifying best practice in the formal development of national emergency management doctrine.
- Developing accredited education and training to complement National Emergency Management Competency Standards.
- Making extensive use of the 'information super highway' to disseminate and exchange information both nationally and internationally.
- Actively contributing to the strengthening of emergency management capabilities overseas, particularly in the South Pacific.

5. Australia's Expectations of the Asian Disaster Reduction Center

Australia notes that the Asian Disaster Reduction (ADRC) aims to be a center for promoting multi-national disaster reduction cooperation, by promoting the exchange of disaster reduction experts from each country and concerned bodies, accumulating and providing disaster reduction information, and carrying out research into multi-national disaster reduction cooperation.

Australia therefore believes that ADRC can best serve its interests and those of member countries and concerned bodies by focussing on the agreed aim. This will enable the ADRC to establish itself as a 'center of excellence' for promoting the exchange of disaster experts, for accumulating and providing disaster reduction information and for conducting research into disaster reduction. It will also ensure that the ADRC does not duplicate the activities of other organisations such as the UN and ADPC but rather be recognised as an authoritative source of information for these organisations.

From an Australian perspective, we believe that the greatest benefits in disaster reduction will be achieved through access to and sharing of current and reliable disaster management information and through the application of the results of research.

Some areas where Australia believes that ADRC could play a significant role during its formative stage are as follows:

- **World Wide Web** The World Wide Web continues to develop as a key medium for the rapid exchange of information. By developing the Homepage so that it is recognised as the prime source of disaster reduction information in the region, ADRC will be better able to become a leader in the rapid gathering, processing and sharing of information. The inclusion of the following would enhance the quality of the current ADRC Homepage:
 - information on the objectives, priorities and plans for the ADRC,
 - details of disaster management arrangements in member countries,
 - links to Homepages of member countries and other recognised disaster management,
 - ADRC points of contacts in member countries and concerned bodies, and
 - publishing of other information of interest to members.

- **Newsletter** A regular newsletter would provide a medium for disseminating information on the activities of ADRC and assist with the wider international recognition of the Center. It would also be particularly helpful to countries which do not as yet have access to the World Wide Web. Notwithstanding, it would enable the activities of ADRC to be publicised wider within countries. Contributions to the newsletter from member countries on activities of interest to others would assist the information sharing process.
- **Risk Assessment** With the growing levels of risk and the corresponding reduction in dedicated resources, there is clearly a need for all countries to adopt an approach that provides managers, countries and organisations with tools to select the most disaster reduction measures to deal with their particular needs. Risk management provides such an approach and the first step is the conduct of risk assessment studies. ADRC could greatly assist member countries by initiating appropriate emergency risk assessment activities to assist countries to accurately assess the degree of risk in countries concerned (types and probability of disasters, anticipated scale and scope of damages, local vulnerability etc.).
- **Annual Forum** An annual forum hosted by ADRC and focussed on matters of interest to member countries would enable ADRC to play a leadership role in disaster reduction in the region. Such a forum would enable face-to-face discussion and the sharing of information between disaster managers from member countries on matters of mutual interest to countries. The First International Meeting would seem to be an appropriate forum to discuss the viability of this approach.
- **Participation in International Forums.** ADRC should become an active participant in international conferences and forums dealing with disaster reduction matters and, in particular, information exchange. The Global Disaster Information Network (GDIN) would appear to be one such forum in which ADRC should be a key player. GDIN is next due to meet in Mexico in late May 1999.

Australia recognises that it will take some time for ADRC to become fully established and to be recognised as a leader in disaster reduction activities in the region. A graduated approach will be necessary initially to ensure that activities undertaken can be completed efficiently. Development of a strategic plan to provide the basis for direction and priorities for the future would ensure the success of such an approach. It is suggested that such a plan developed in consultation with and endorsed by member countries would provide the best guarantee of success for the ADRC.

6. Major Natural Disasters Since 1990

The following pages provide information on major disasters that have occurred in Australia since 1990.

Australia has been able to respond to these disasters using its own internal resources. No external assistance has been sought.

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: April 1990

Type of Disaster: Floods

Name of Disaster: 1990 Great Floods

Damage:

Dead and missing: 7 people

Injured: 60 people

Made homeless: 5,000 people

Description of Damage:

Over 17 000 people were directly affected by the slow onset floods ? homes and business premises were flood damaged in Southern Queensland, northern and central New South Wales and eastern Victoria, the floods being the worst for 35 years. Over one million head of livestock died, and over 1 million square miles were inundated.

Insurance losses totalled \$US 27 million; estimated total losses were \$US 286 million (in 1998 values)

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: January 1991

Type of Disaster: Severe Storms

Name of Disaster: Northern Sydney Storms

Damage:

Dead and missing: 1 person

Injured: 100 people

Made homeless: 600 people

Description of Damage:

In northern Sydney, New South Wales, over 350 000 people were affected by the storms ? wind, large hail stones and falling trees damaged over 7 000 homes with 20 totally destroyed. Over 140 kms of powerlines and 3 steel towers were knocked down. Estimated wind strengths were 188-230 km/hr resulting in over 50 000 significant trees felled or severely damaged.

Insurance losses totalled \$US 155 million; estimated total losses were \$US 465 million (in 1998 values)

Items of note to disaster-reduction policy-makers:

The need for weather radar which can provide localised forecasting for areas particularly vulnerable to severe storms.

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: October 1993

Type of Disaster: Flood

Name of Disaster: North East Victoria Floods

Damage:

Dead and missing: 1 person

Injured: 30 people

Made homeless: 5,500 people

Description of Damage:

Flooding had a severe effect on the north-eastern Victorian towns of Benalla, Shepparton, Wangaratta and Euroa in October 1993 when 12 'mountain' rivers in the region suddenly flooded simultaneously. A total of 5,500 people were evacuated as floodwaters swirled into more than 4,000 homes, shops, farms and orchards. Thousands of livestock, fruit and vegetable crops, and dairy production were lost. This, and very heavy damage to roads and bridges all contributed to high economic loss. A total of 15,000 people were affected.

Insurance losses totalled \$US 9 million; estimated total losses were \$US 308 million (in 1998 values)

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: 27 December 1993 to 16 January 1994

Type of Disaster: Bushfire

Name of Disaster: NSW Bushfires

Damage:

Dead and missing: 4 people

Injured: 120 people

Made homeless: 900 people

Description of Damage:

Along the east coast of New South Wales (including Sydney), over 250 000 people were affected by the fires; houses destroyed ? 206; other building destroyed ? 20; land burnt out ? 800 000 hectares; fencing destroyed ? 600+ kms; livestock killed/destroyed ? 200+; native wildlife killed/destroyed ? number unknown; 40 National Parks affected

Insurance losses totalled \$US 39 million; estimated total losses were \$US 117 million (in 1998 values)

Items of note to disaster-reduction policy-makers:

The need for standardisation of procedures and, if possible, equipment with, as a minimum, interoperability of communications equipment where multi-agency/multi-jurisdiction assets are employed.

The need to achieve a balance between fuel reduction programs and environmental pressures/requirements.

Other information:

20,000 plus firefighters (mainly trained volunteers) and the armed forces were deployed from all states of Australia to fight over 800 fires over the three week period.

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: May 1996

Type of Disaster: Floods

Name of Disaster: Southern Queensland/Northern NSW Floods

Damage:

Dead and missing: 4 people

Injured: 20 people

Made homeless: 100 people

Description of Damage:

About 10,000 people were affected when heavy flooding occurred along large coastal and hinterland areas of southern Queensland and northern New South Wales forcing the evacuation of hundreds of people and aerial food drops to isolated settlements. Homes and businesses in the Laidley area west of Brisbane, and the Grafton area (northern New South Wales) were inundated. Further west in both states, vegetable and cotton crops were seriously damaged or destroyed. Landslides and beach erosion were also caused along the coast. In many parts of southern Queensland the floods were the worst since 1974 and on the Clarence River (New South Wales) they were the worst since 1976.

Insurance losses totalled \$US 22 million; estimated total losses were \$US 160 million (in 1998 values)

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: September 1996

Type of Disaster: Severe Storms

Name of Disaster: Armidale Storms

Damage:

Dead and missing: 0

Injured: 10 people

Made homeless: 120 people

Description of Damage:

25,000 people were affected when a powerful severe thunderstorm struck Armidale, New South Wales, with 160 km per hour winds and up to 8 cm hail causing moderate to severe damage to 90% of the town's 6,500 houses. Many large buildings and 5,000 cars were also damaged. Three tornadoes were reported in nearby areas adding to property and agricultural losses.

Insurance losses totalled \$US 73 million; estimated total losses were \$US 225 million (in 1998 values)

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: March 1997

Type of Disaster: Tropical Cyclone

Name of Disaster: Cyclone Justin

Damage:

Dead and missing: 7 people

Injured: 30 people

Made homeless: 10 people

Description of Damage:

Although only a 'Category 2' cyclone, Cyclone Justin caused significant damage in the Cairns region, in northern Queensland, which it approached on two occasions during its long (3? week) life. Houses were undermined by huge waves, a marina and boats were severely damaged, roads and bridges suffered from flood and landslide damage and huge losses were inflicted on sugar cane, fruit and vegetable crops. The death toll of 7 in Queensland included 5 on a yacht which sank. 10,000 people were affected by the cyclone. 26 people died in Papua New Guinea which was also severely affected.

Total estimated losses were \$US 133 million (in 1998 values)

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: July 1997

Type of Disaster: Landslide

Name of Disaster: Thredbo Landslide

Damage:

Dead and missing: 18 people

Injured: 1 person

Made homeless: 10 people

Description of Damage:

Australia's worst landslide occurred when a large section of steep mountainside (below a road) collapsed onto a ski lodge in the alpine village of Thredbo, New South Wales, at night. The building was swept down the slope colliding with a second lodge in which people were sleeping. Both multi-level buildings were crushed under about 1000 tonnes of earth, rock and trees, leaving debris including cars for 250 metres down the mountainside. Only one survivor was found by rescuers. He had survived for 65 hours, trapped beneath the rubble, in temperatures as low as -12°C.

Total estimated losses: \$30 million (in 1998 values)

Major Natural Disasters Since 1990

Country: **AUSTRALIA**

Date of Disaster: January 1998

Type of Disaster: Floods

Name of Disaster: Townsville/Katherine Floods

Damage:

Dead and missing: 5 people

Injured: 90 people

Made homeless: 2170 people

Description of Damage:

In January 1998, two ex-tropical cyclones caused severe flooding in parts of northern Queensland and the Northern Territory of Australia.

At Townsville, Queensland, flash floods (caused by 361 mm of rain in 6 hours) killed two men, destroyed 14 homes and severely damaged a further 33. A total of 5,000 homes were partly damaged and cars and boats washed away, some out to sea. Hundreds of people were evacuated and up to 50,000 were affected in some way. Water up to 3 metres deep caused heavy commercial, industrial, agricultural and infrastructure damage. A large landslide was triggered on nearby Magnetic Island damaging cars and a holiday resort.

At Katherine in the Northern Territory, the Katherine River reached record levels causing the evacuation of over 5,000 people. The entire town (of 10,500 people) was affected with all roads cut, over 50% of the homes flooded and 500 commercial premises covered by up to 3 metres of water. At its peak, the flood covered over 1,000 square kilometres of land. Three people died.

Combined, the Townsville and Katherine Floods resulted in insurance losses totalling \$US 98 million; and estimated total losses \$US 280 million (in 1998 values)

