



# ENHANCING SUSTAINABILITY THROUGH PRE-EVENT RECOVERY PLANNING

BY JULIA BECKER AND WENDY SAUNDERS OF GNS SCIENCE, LOWER HUTT

**T**his article focuses on a land-use planning perspective of recovery after a natural hazard event. In particular, we discuss recovery in a New Zealand context, and discuss sustainability and holistic recovery.

We then outline a methodology showing that you can pre-plan for how land may be 'recovered' or used after an event. Pre-planning for land-use recovery is important because it means that:

- ***Recovery is proactive – rather than reactive which can lead to poor decision-making;***
- ***Recovery can incorporate principles of sustainability;***
- ***Recovery can begin without the need to think about and/or plan for land-use changes;***
- ***Future hazard risks can be reduced during recovery;***
- ***Ideas and plans can be developed and discussed by communities and options analysed for different land-use options before an event;***
- ***Landowners are provided with options for reducing hazard impacts;***
- ***Consents can be gained in advance for spoil disposal sites, including those for contaminated materials from road slips, building debris, volcanic ash disposal etc;***

OPPOSITE :: The settlement of Tangimoana is inundated in flooding occurring in February 2004.

(Photo: Ministry of Civil Defence and Emergency Management, 2004.)

RIGHT:: A tsunami affecting Gisborne in 1960.

(Photo: Gisborne District Council.)

- **Plans can be developed pro-actively to reduce or avoid the level of impact of a hazard event.**

The likelihood of experiencing an extreme hazard event of some sort in New Zealand (be it geologically, meteorologically, health or technology related) is high. Communities have suffered repeatedly throughout history from a variety of events, including storms and floods, earthquakes, landslides, volcanic events and tsunamis, as illustrated. Community recovery from events such as these has often occurred somewhat haphazardly. In general, the focus has been on restoring normal functioning as quickly as possible, but often this has been at the expense of adopting a long-term vision for the improvement of a community.

Recovering from the impacts of a disaster is a complex process, and involves communication and co-ordination with many different parties in order to achieve regeneration of a community. Therefore, even though recovery is something that happens after a disaster, it is important to consider recovery issues before an event occurs. By considering issues and solutions before an event occurs, the process of recovery can be greatly improved, resulting in coordinated, efficient and targeted reinstatement of affected areas. We have named this concept "pre-event recovery planning".

### Recovery in the New Zealand context

The concept of recovery is primarily covered as part of the 4Rs (reduction, readiness, response and recovery) under the Civil Defence Emergency Management Act 2002 (CDEM Act). The Ministry of Civil Defence and Emergency Management defines 'recovery' as:

"The co-ordinated efforts and processes to effect the immediate, medium, and long-term holistic regeneration of a community following a disaster" (Ministry of Civil Defence and Emergency Management, 2005).

The CDEM Act requires that Civil Defence



Emergency Management Groups be formed (based on current regional council boundaries), and that these groups formulate CDEM Plans to address the 4Rs.

Recovery planning most obviously falls under the concept of 'recovery', but pre-event recovery planning also has strong links to the first of the 4Rs – 'reduction'. Reduction focuses on reducing the risk to communities – much of which can be undertaken during periods of quiescence. Hence, pre-event recovery planning is a key component of reduction.

While acknowledging that CDEM planning should take reduction into account, there are also other vehicles that can incorporate aspects of reduction. The Resource Management Act 1991, for example, requires that local authorities address the management of natural hazards through regional policy statements and district plans (ss30, 31, 62). These documents can provide key policies and methods for addressing hazard risk reduction, and can aid significantly in the pre-event recovery planning process.

### Sustainability and holistic recovery

The principle of sustainability is widely referred to in hazards management literature (Natural Hazards Centre, 2001). According to Mileti (1999), sustainable communities are able to thrive from generation to generation because they

have, among other things, incorporated disaster resilience and mitigation into their activities. This outlook is shared by the United Nations International Strategy for Disaster Reduction (2003) which argues that sustainable and integrated management of natural resources will increase the resilience of communities to disasters by reversing current trends of environmental degradation.

Ideally, when planning for recovery, a community should attempt to incorporate the principles of sustainability in every decision about reconstruction and re-development (Natural Hazards Centre, 2001; Monday, 2002). Undertaking pre-planning can assist in sustainable recovery because it allows sustainable concepts and ideas to be thought through before a hazard event occurs. Provisions can then be made in advance to allow those ideas to be implemented following an event.

### Methodology for pre-event land-use recovery

A methodology for pre-event land-use recovery planning has been developed based on the Australian/New Zealand Risk Management Standard 4360:2004 (Becker et al., 2006). The methodology is presented in the form of a flow chart (Figure 3) allowing users to follow a comprehensive set of steps in completing the

# PRE-EVENT RECOVERY PLANNING FOR LAND USE – A METHODOLOGY

## ESTABLISH THE CONTEXT AND IDENTIFY RISKS

### Gather existing information e.g.

- Natural hazards literature relevant to community
- Regional and District Plans
- Civil Defence Emergency Management Group Plans
- Hazard registers/Hazard maps
- Expert opinions
- Community input

- Asset Management Plans/ Insurance plans
- Business Continuity Plans/ Risk Management Plans
- Lifelines reports

### Identify Risks

- What communities are at risk?
- What key facilities are at risk?

## IDENTIFY GAPS

- Undertake gap analysis - have all hazards and risks been identified in existing information?
- Does existing information takes a consistent approach to hazard identification and management?

## ANALYSE RISKS AND DEVELOP OPTIONS FOR RECOVERY

### Considerations



**YES** Could the land use be repaired? --->

**NO**

**YES** Could the land use be reconstructed?-->

**NO**

**YES** Could the land use be relocated? --->

**NO**

- What actions are needed now to secure land for relocation prior to, or following an event?
- District Plan issues (zoning, rules)
- What mechanisms can assist relocation? (e.g. insurance plans, fast-tracking resource consents)

Is there residual risk?

**YES**

Is the level of risk acceptable?

**NO**

Other options:  
?? Cease land use??  
?? Convert to passive reserve ??

**NO**

**YES**

Undertake community engagement exercise to communicate risk

## EVALUATE RISKS AND PRIORITISE OPTIONS

- What communities are most at risk?
- What key facilities are most at risk?
- What actions can be undertaken now to assist effective land use recovery?
- Compare the social/economic/natural and built environment considerations

## TREAT RISKS (IMPLEMENTATION)

### Identify and assess tools for implementation e.g.

- Regional and District Plans
- Civil Defence Emergency Management Group Plans
- Long Term Community Council Plans

- Structure Plans
- Non-regulatory documents e.g. Asset Management Plans, Business Continuity Plans/ Risk Management Plans, Growth Strategies

**Prepare and implement pre-event land use recovery planning initiatives**

COMMUNICATE AND CONSULT

MONITOR AND REVIEW

LEFT:: Figure 3 – flow chart detailing a methodology for land use pre-event recovery planning.

process of planning for land-use recovery.

Following the methodology in Figure 3, once the risks have been evaluated and treatment options prioritised, there needs to be some method available to deliver the options so that risk treatment can occur. This can include Regional and District Plans; Civil Defence Emergency Management Group Plans; Long Term Council Community Plans; Asset Management Plans; structure plans; growth strategies; and other non-regulatory documents e.g. business continuity plans and risk management plans.

Tables 1 and 2 outline some specific measures that can be used to help with land-use recovery after an event. Alongside each measure, the planning frameworks in which these can be incorporated are listed. If consideration is given to these measures prior to an event, it will allow more efficient implementation after an event has occurred, leading to a more efficient recovery.

An important consideration when undertaking pre-planning is that different planning documents should be linked to ensure that certain issues are not forgotten. For example, the CDEM Group planning process should not simply assume that reduction is covered by the district planning process. There should be communication and agreement between different departments over responsibility, and then the CDEM plan should outline its definition of reduction, whose responsibility it is, what document(s) address reduction, and what issues the document(s) cover. Likewise, the District Plan should outline and elaborate upon those aspects agreed upon (Saunders et al., submitted 2006).

This methodology is currently being tested within the New Zealand planning framework, using Wellington as a case study. International case studies outlining pre-event recovery for land use are available for the hazards of flooding, hurricanes, and earthquakes in Schwab et al, 1998.

## Conclusions

As communities have grown over the years, they have expanded even further into marginal areas – into places which original communities

**Table 1:: General planning measures which can be of use for immediate land-use recovery purposes after an event (after Schwab et al., 1998)**

Measures	Framework for incorporation
Damage assessments after an event (which can be integrated with Global Positioning Systems (GPS) and Geographical Information Systems (GIS))	CDEM (damage assessments)
Identify new lessons discovered during response and initial recovery after the event	CDEM (damage assessments), RES
Development moratorium, whereby development decisions are halted for a period of time after an event.	DP, RP
Temporary repair permits/consents	DP, RP
Emergency consents (e.g. for removal of debris)	DP, CDEM Act, RP
Regulations which deal with demolition issues	DP, BA
Zoning for temporary housing	DP
Setting priorities for infrastructure repairs before an event.	ASSET, LTCCP
Identify sites for emergency operations	CDEM, DP, BUS
Feasibility of emergency evacuation	CDEM
Historic preservation (e.g. What to do with a historic building that has been damaged?)	DP, LTCCP

KEY: : DP – District Plan, RP - Regional Plan, RPS – Regional Policy Statement, CDEM – CDEM Group Plan, BA- Building Act, LTCCP – Long Term Council Community Plan, HAZ – Hazard Mitigation Plans, ASSET – Asset Management Plans, RES – general research, BUS – Business continuity plans, OTHER – Other non-statutory plans.

often avoided. We have also started to rely on engineering measures to mitigate the hazards that exist.

However, instead of solely relying on hard mitigation measures as a solution, we should be looking to the future to plan proactively, and to make a conscious effort to avoid hazardous areas where possible.

Pre-event land use recovery planning is one aspect of this proactive planning. In areas where there is no existing development, it provides a chance to take account of hazards, and plan accordingly to avoid them.

Where development is already present, it provides us with an opportunity to consider the impacts of future hazard events, reduce any risk, and plan for an effective recovery.

In New Zealand there are a number of existing frameworks and processes available that can be

adapted to accommodate pre-event land use recovery planning, making it part of everyday routine. These include Regional and District Plans, Civil Defence Emergency Management Group Plans, Long Term Council Community Plans, Asset Management Plans, structure plans, growth strategies and other non-regulatory documents e.g. business continuity plans and risk management plans.

Planners and emergency management staff can work together and begin planning proactively within these frameworks right now. Certain planning measures (as outlined in Tables 1 and 2) can be effectively utilised to reduce the risk to communities, and to enhance our recovery to hazard events.

For further information, or for a copy of the full science report outlining the methodology in detail, please contact the authors.

**Table 2:: Longer term planning measures which can be used as part of pre-event preparation (after Schwab et al., 1998)**

Measures	Framework for incorporation
Acquisition of property in hazardous zones.	DP, LTCCP, growth strategies, Local Government Act
Use of easements.	DP
Infrastructure development policies, which restrict the development or replacement of infrastructure in hazardous areas.	ASSET, LTCCP, HAZ, RP, DP
Floodplain management plans (and flood insurance regulations).	HAZ, ASSET
Assessment of Environmental Effects (AEE)	DP, RP
Stormwater management plans	ASSET, HAZ, OTHER
Zoning tools (for example, zoning can be used to prevent new development in hazardous areas, minimise densities in hazardous areas, etc).	DP
Subdivision control and design. Requirements may be placed on an approved development only allowing particular design features, etc, in order to mitigate the risk to hazards.	DP
Design controls may also be placed on the landscape (e.g. retaining a coastal dune) in order to mitigate a hazard.	DP
Re-planning of areas which may be stricken by an event	DP, RP
Examination of street patterns for access	DP
Financial tools, such as allocating funds for recovery, ensuring relocation assistance is available, implementing taxation or fee-based systems to collect revenue for the upgrade of facilities or recovery purposes, etc.	LTCCP, ASSET
Ensuring there is co-ordination between organisations and agencies that may be involved in emergency management.	CDEM
Training programmes for those involved with emergency management	CDEM
Identification of hazards, and use of that information in planning	RPS, RP, DP, CDEM, RES, OTHER
Use of GIS and GPS	DP, HAZ, RP
Community participation and public education (for examples, see Finnis, 2004)	LTCCP, CDEM
Re-evaluation and update of plans	All plans
Compliance of rebuilding with new regulations formulated from lessons learned (e.g. account for any new regulations added to the Building Act, Building Standards, etc., after the event, or any completely new Acts/standards created).	When rebuilding, account for any new regulations, as part of the consent process.

KEY: DP – District Plan, RP – Regional Plan, RPS – Regional Policy Statement, CDEM – CDEM Group Plan, BA – Building Act, LTCCP – Long Term Council Community Plan, HAZ – Hazard Mitigation Plans, ASSET – Asset Management Plans, RES – general research, BUS – Business continuity plans, OTHER – Other non-statutory plans.

## Acknowledgements

The authors would like to acknowledge the support of the Foundation for Research, Science and Technology. We would also like to thank our external and internal reviewers who provided valuable feedback during the development of the methodology including Sarah Stuart-Black, Ministry of Civil Defence and Emergency Management; Darren King, NIWA; Gina Sweetman, Ministry for the Environment; Brett McKay, Wellington City Council; David Johnston, GNS Science; and Phil Glassey, GNS Science.

## References

- Becker, J., Saunders, W., Kerr, J., 2006. Pre-event Recovery Planning for Land-use in New Zealand. *GNS Science Report 2006/23*.
- Finnis, K., 2004. Creating a Resilient New Zealand. Wellington: Ministry of Civil Defence and Emergency Management. Available at: [www.civildefence.govt.nz](http://www.civildefence.govt.nz).
- Ministry of Civil Defence and Emergency Management, 2005. Focus on Recovery – A Holistic Framework for Recovery in New Zealand. IS5/05. Wellington: Ministry of Civil Defence and Emergency Management. Available at: [www.civildefence.govt.nz](http://www.civildefence.govt.nz)
- Mileti, D., 1999. *Disasters by Design: A Reassessment of Natural Disasters in the United States*. Washington, DC: Joseph Henry Press.
- Monday, J.L., 2002. Building back better: Creating a sustainable community after disaster. *Natural Hazards Informer*, 3, January 2002.
- Natural Hazards Centre, 2001. Holistic Disaster Recovery. Sources of Information. Natural Hazards Research and Applications Centre, University of Colorado.
- Saunders, W., Forsyth, J., Johnston, D.M., Becker, J., submitted 2006. Strengthening linkages between land-use planning and emergency management in New Zealand. *Australian Journal of Emergency Management*.
- Schwab, J., Topping, K.C., Eadie, C.C., Deyle, R.E., Smith, R.A., 1998. Planning for Post-Disaster Recovery and Reconstruction PAS Report No. 483/484. Chicago, Illinois: American Planning Association. Abstract available at: [www.planning.org/apapubs/details.asp?Num=1178](http://www.planning.org/apapubs/details.asp?Num=1178).
- United Nations International Strategy for Disaster Reduction, 2003. Disaster Reduction and Sustainable Development Understanding the links between vulnerability and risk to disasters related to development and environment. United Nations International Strategy for Disaster Reduction. Available at: [www.unisdr.org](http://www.unisdr.org).