



Planned Relocation

Protecting our Communities

March 2023

R h e l m



Letter from the CEO

Our purpose at IAG is to make your world a safer place. We are proud to deliver on our purpose and help build safer and more resilient communities.

Over many years we have highlighted the importance of investment in mitigation initiatives to help protect and prepare communities before disasters strike.

Today, across the country, we continue to have communities suffering the devastating impacts of floods, bushfires, and cyclones. While ongoing investment in mitigation is a critical step to protect people from imminent danger, we believe it is also important for governments and communities facing a high or extreme risk from these natural disasters to consider when and how to plan for relocation.

IAG has commissioned this report to explore the enablers and barriers for planned relocation in Australia, the role the community plays in decision making and the policy considerations for delivering a planned relocation scheme.

The timely analyses demonstrates that Australian communities must consider how to mitigate and adapt to natural disaster risk but also understand and plan for relocation when the risk to life and safety exceeds a safe threshold.

The report outlines seven recommendations, including

- The development of national guidance on planned relocation
- Prioritisation and funding for social support for residents as part of any planned relocation scheme
- Establishment of a legislative framework for accelerated approvals for planned relocation, including re-zoning, subdivision, and development approvals

Our nation has the ability to prevent future loss of life, property, and community suffering from natural disasters with sustainable long term solutions. It is our hope that funding for mitigation will be expanded to include planned relocation for the communities most at risk, and that the recommendations in this report will be realised and undertaken with urgency.

We are dedicated to working with governments and communities for opportunities to reduce severe weather risk and help protect lives and property into the future.



Nick Hawkins
IAG Managing Director & CEO

Executive Summary



2020 Bushfires – Remains of a Dwelling in Bilpin (NSW)²

Historically, natural hazards such as bushfires, floods, earthquakes and cyclones have caused loss of life and significant damage to property and infrastructure in Australia. For example, it is estimated that the total social, financial, and economic costs of the 2022 South East Queensland floods alone were \$7.7 billion¹.

The impacts of natural hazards can be mitigated by a range of protection or adaptation strategies. Planned Relocation is one option that may be considered from a portfolio of hazard mitigation options. It involves the removal of properties and assets impacted by natural hazards from the location at risk.

This discussion paper provides an investigation into the enablers and barriers of Planned Relocation in Australia for residential properties, as an adaptation response to natural hazards. It has been informed by a **Fact Finding** process, which included case study reviews, stakeholder engagement and literature review. This discussion paper is intended to contribute to the Planned Relocation evidence base so that decision makers can engage in informed conversations on the issues related to Planned Relocation in Australia.

The **Planned Relocation Framework** discussed in this paper deals with the types of Planned Relocation (Buy-Back and Community Relocation), and how they can differ from each other. Consideration is given to the stages of Planned Relocation (Figure i), and the need to consider the “integration” stage (being the integration of the community into the new location) in developing a scheme.

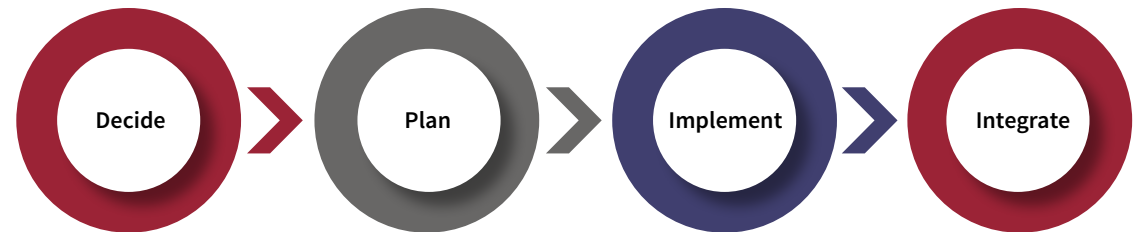


Figure i. Stages of Planned Relocation

¹ Deloitte (2022). The study looked at the cost to Queensland only. It is noted that the NSW Northern Rivers region experienced significant flooding at the time of the Southeast Queensland floods and would therefore add to the total magnitude of the impacts.

² Source : Daniela Contantinescu/ Shutterstock.com



Lismore (NSW) – March 2022 flooding³

The **Community** is an essential part of developing and implementing a Planned Relocation Scheme. However, the community issues and needs can be highly complex, and location specific. The focus of this paper is to highlight some of the key community themes and issues that were identified in the fact finding so as to inform subsequent strategies and investigations.

The **Delivery** of the scheme includes the policy considerations, the timing of when the scheme is implemented (e.g. pre or post natural hazard event), as well as the management and funding of the scheme.

Finally, the paper undertakes a **Feasibility Assessment** of Planned Relocation in a selection of representative locations, using economic, risk to life and affordability indicators. A summary of the economic costs and benefits is provided in Table i. The review was undertaken using representative locations in Australia, and focusing on flood affectation. The review identified that Planned Relocation was economically viable under certain conditions, particularly in higher risk locations.

There are a number of key recommendations identified in this paper to support future Planned Relocation planning and implementation, which are summarised in Table ii.

Table i. Summary of Economic Costs and Benefits

COSTS	BENEFITS
Property Purchase (Buy-back)	Avoided property damages
New Land Purchase (Relocation)	Avoided public infrastructure damages
Subdivision and new dwelling construction (Relocation)	Avoided post flood clean-up costs
Demolition and rehabilitation of land (both)	Avoided emergency response costs
	Intangibles (such as risk to life, post-event trauma etc)
	Rehabilitated land benefits (e.g. creation of parks etc)

³ Source : NSW Spatial Services 2022

Table ii. Key Recommendations

RECOMMENDATION	
1	<p>Develop national guidance on Planned Relocation, outlining key guiding principles and processes for the Australian context. This should cover:</p> <ul style="list-style-type: none"> • Key objectives and performance indicators for Planned Relocation Schemes. • Models for Planned Relocation (e.g. buy-back and community relocation). • Guidance on the planning, decision-making, implementation, and integration phases. • Models for holistic community engagement, including specific considerations for First Nations People. • Consideration of vulnerable community members, including people with a disability and the elderly. • Guidance on land use planning and management, including the management of vacated land.
2	<p>Prioritise and fund integration support measures for relocated residents as part of Planned Relocation Schemes. For buy-back schemes this may come in the form of appropriate social support and/or financial support recognising additional relocation costs, while community relocation schemes should include appropriate physical and social infrastructure.</p>
3	<p>Planned Relocation should be coordinated by State and Territory Government agencies to centralise key skill sets and achieve appropriate economies of scale, while ensuring that Local Government remains a key stakeholder.</p> <p>Planned Relocation requires a coordinated and consultative approach across Federal, State / Territory and Local Governments.</p>
4	<p>Responsible agencies should proactively identify high-risk locations and develop Community Adaptation Plans prior to a natural hazard event occurring. This will allow for relocation to be pro-active before a natural hazard event occurs and/ or be implemented swiftly following a natural hazard event. Identification and prioritisation of high-risk locations should utilise risk data through a range of sources, including Local Government, State / Territory Government and other sources such as the Hazards Insurance Partnership.</p>
5	<p>Federal and State Governments should formalise funding arrangements, to ensure Planned Relocation Schemes can be adequately funded on an ongoing basis commensurate to the risk to life, property, and the economy.</p>
6	<p>Establish legislative framework for accelerated approvals for Planned Relocation, including re-zoning, subdivision and development approvals.</p>
7	<p>Review the outcomes of large-scale implementations of Planned Relocation (e.g. NSW and Qld Resilient Homes Funds) to inform development and refinement of National Guidance and frameworks. Continue to monitor the performance of schemes and ensure that guidelines are reviewed at regular intervals.</p>

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Introduction

Historically, natural hazards such as bushfires, floods, earthquakes and cyclones have caused loss of life and significant damage to property and infrastructure in Australia.

The social, financial and economic costs of natural hazards provide an ever increasing challenge for Australia. For example, Deloitte (2022) estimated that the total social, financial, and economic costs of the 2022 South East Queensland floods alone were \$7.7 billion. Further, Deloitte (2021) found that natural disasters currently cost the Australian economy on average \$38 billion per year, a cost that Deloitte (2021) projected to rise to \$73 billion per year by 2060 when factoring in population growth, climate change and property value growth.

The impacts of natural hazards can be mitigated by a range of protection or adaptation strategies. One option is the removal of the properties and assets impacted by natural hazards from the location at risk. This is commonly referred to as Managed Retreat or Planned Relocation. This paper favours the use of the terminology **‘Planned Relocation’** due to the importance of proactive action, and associated language, in natural hazard mitigation.

In response to recent flood events in Australia’s eastern states, both the Queensland Government⁴ and the NSW Government⁵, in conjunction with the Commonwealth, are undertaking large-scale retrofitting, raising, and relocation efforts for affected areas. Those most at-risk may be eligible to relocate their homes. Together, the two schemes provide around \$1.5 billion in flood resilience funding with a portion to be allocated to the voluntary purchase of high-risk properties.

Scope and Key Objectives

The focus of this discussion paper is to report on Rhelm’s investigation into the enablers and barriers of Planned Relocation in Australia for residential properties.

The scope of the assessment focuses on the implementation of Planned Relocation, once a decision has been made that this is the best available alternative. The paper assumes that Planned Relocation is one viable option to be considered in a portfolio of hazard mitigation options and does not evaluate Planned Relocation over other natural hazard mitigation options.



Lismore (NSW) – Household contents on the street after being damaged by the flood (7 – 8 March 2022)

⁴ Queensland Government (2022). *Home Buy-back*, <https://www.qld.gov.au/housing/buying-owning-home/financial-help-concessions/resilient-homes-fund/options/buy-back>

⁵ NSW Government (2022). *Northern Rivers’ Voluntary Home Buy Backs to Start*, press release, 28 October 2022, <https://www.nsw.gov.au/media-releases/northern-rivers-voluntary-home-buy-backs-to-start>



2009 Black Saturday Fires, Victoria⁷

The key objective of this project was to provide research around Planned Relocation, its role in risk management, and key recommendations to improve implementation of Planned Relocation in response to natural hazards across Australia.

The discussion paper is intended to contribute to the Planned Relocation evidence base so that decision makers can engage in informed conversations on the issues related to Planned Relocation in Australia.

Overview

Planned Relocation can be defined as the relocation of structures or abandonment of land to manage natural hazard risk⁶. The scale of Planned Relocation may involve the movement of individual households, infrastructure, or entire communities.

The focus of this report is on Planned Relocation in response to natural hazards, such as floods, coastal erosion and bushfires. However, the report has been informed by case studies that also include other hazards, such as mining or man-made contamination.

Approach

The work undertaken for this paper has been informed by a **Fact Finding** process, which included case study reviews, stakeholder engagement and literature review. The paper deals with a number of key elements:

- The **Planned Relocation Framework** deals with the types of Planned Relocation and considerations in developing a scheme;
- **Community**, being key to the development of a Planned Relocation Scheme;
- **Delivery**, which includes the policy considerations, the timing of when the scheme is implemented (e.g. pre or post natural hazard event), as well as the management and funding of the scheme.

Finally, the analysis has been supported by a **Feasibility Assessment** of Planned Relocation in a selection of representative locations, using economic, risk to life and affordability indicators.

⁶ University of California definition, adopted by World Bank (2019) symposium on *Managed Retreat as Counter Measures against Disasters with a Diversity Perspective*

⁷ source : Myszka/ Shutterstock.com

Fact Finding

This discussion paper was informed by a fact finding and research process. This included a review of case studies of Planned Relocation, both within Australia as well as internationally, engagement with a select number of stakeholders, as well as a review of existing policies and guidance.

Case Studies

Case studies provide an opportunity to understand, and learn from, previous Planned Relocation Schemes. A total of 10 case studies were reviewed (Table 1). These case studies were selected to ensure that they represented a range of Planned Relocation mechanisms, as well as a range of natural hazards and geographical locations.

As a part of the case study review, engagement was undertaken with stakeholders relevant to a selection of the case studies, to provide more in-depth understanding.

A summary of the case studies is provided in **Appendix A**.

Stakeholder Engagement

In addition to the case studies, a range of stakeholders were consulted with as a part of the fact finding and research process. These stakeholders focused primarily on community support organisations, and to gain further insight into the case studies reviewed.

Table 1. Case Studies

CASE STUDY	TYPE	HAZARD	LOCATION
Grantham relocation	Relocation	Flood	Queensland, Australia
Tweed River Voluntary House Purchase	Buy-Back	Flood	New South Wales, Australia
Victorian bushfire buyback scheme	Buy-Back	Bushfire	Victoria, Australia
Geraldton coastal erosion	Relocation	Coastal erosion	Western Australia, Australia
Loose fill asbestos eradication scheme (Mr Fluffy)	Buy-Back	Loose fill asbestos insulation	Australian Capital Territory, Australia
Wittenoom town closure	Limited Buy-back	Asbestos mining	Western Australia
Westconnex mandatory housing acquisition ⁸	Compulsory Purchase	Transport construction	New South Wales, Australia
Christchurch house purchase	Buy-Back	Earthquake liquefaction	Canterbury, New Zealand
Matatā house purchase	Buy-Back	Debris flow (flooding)	Bay of Plenty, New Zealand
Isle de Jean Charles	Relocation	Flooding	Louisiana, United States of America

⁸ While not a natural hazard, Westconnex mandatory house purchase was included in the case study review to investigate the policy enablers of compulsory acquisition to establish if similar policies could be applied in natural hazard mitigation.

Key Themes

The fact finding provided some useful insights into previous Planned Relocation Schemes and stakeholder insights. A general overview of some of the key themes that emerged from the Fact Finding is provided in Figure 1. These themes have informed the recommendations of this discussion paper.



Brisbane River (Qld) flooding 2011⁹

Figure 1. Key Themes



⁹ source : Shutterstock.com



2019 Bushfires near Bilpin, NSW¹⁰

Types of Planned Relocation

There are several different types of Planned Relocation. For the purposes of this discussion paper, they have broadly been categorised into **Buy-Back** and **Community Relocation**.

A **Buy-Back** scheme is one where assistance is provided in the form of an agency purchasing a property that is at risk. However, no support is provided for the relocation of the individual or community to an alternative location. Examples of this type of approach include the NSW Tweed River Voluntary Purchase Scheme for flood affected properties, and the NZ Christchurch house purchase scheme following the 2010 earthquake (and subsequent aftershocks).

By comparison, a **Community Relocation** looks not only at removing the people from the area at risk, but also at the subsequent resettlement of those people in the alternative location. The International Federation of Red Cross (IFRC,2021) defines this¹¹ as:

The intended permanent movement and establishment elsewhere of people exposed and vulnerable to the existing or anticipated effects of disaster or climate change.

IFRC (2021) also notes that the relocation needs to address both the *relocation* of people, as well as the *resettlement* of people, which includes the re-establishment of lives and livelihoods post the physical movement of people.

Similarly, United Nations High Commissioner for Refugees (UNHCR, 2015) defines Community Relocation¹² as:

A planned process in which persons or groups of persons move or are assisted to move away from their homes or places of temporary residence, are settled in a new location, and provided with the conditions for rebuilding their lives¹³.

Specifically, both of these references emphasise the importance of the ongoing support for communities in re-establishing themselves.

Examples of a Community Relocation include the Grantham Relocation scheme following the 2011 flood event and the Geraldton Coastal Erosion scheme.

¹⁰ source : Carl Oberg/ Shutterstock.com

¹¹ IFRC (2021) refers to Planned Relocation, which is synonymous in the international literature with Community Relocation in this paper.

¹² As per note above, UNHCR (2015) refers to Planned Relocation, which is equivalent to Community Relocation in this paper.

¹³ Underline added for emphasis.

Policies and Guidance

The literature review did not identify any existing overall guidance for Planned Relocation in Australia, although there are some examples of specific guidance. For example, Western Australia developed draft Managed Retreat Guidelines (DPLH, 2017), but these focused on coastal erosion and on the specific policy and legislative mechanisms for land purchase. The NSW Voluntary Purchase Scheme for flooding also provides guidance of relevance to that scheme, and specifically where a property may be eligible. However, there is no guidance on the development and implementation of a Planned Relocation Scheme at a national level.

There are, however, more examples internationally. The International Red Cross has a guide for the Asia-Pacific on planned relocation (IFRC, 2021), while the International Law Association (2018) outlined the principles under which planned relocation should be undertaken. UNHCR (2015) has also developed a guidance on Planned Relocation as well as a toolbox (UNHCR, 2017). Much of this guidance was developed out of resettlement planning associated with infrastructure projects for International Development¹⁴. Many of the principles and frameworks identified in these references are of relevance to Australian conditions.

While some of the principles differ in the international references, the common themes include:

- **Participation** : Relocated communities should be freely informed, consulted and participate in the decision making process;
- **Last Resort** : Planned Relocation as a last resort, once all other risk mitigation and adaptation options have been exhausted;
- **Human Rights** : Safeguarding of the human rights and dignity of those who are relocated, as well as those who may receive or accommodate the relocated people;
- **Funding** : Sufficient and sustainable funds to be allocated;
- **Living Standards** : Living standards prior to relocation to be restored or improved.



2021 Flooding in Forbes, NSW¹⁵

¹⁴ Such as the World Bank Involuntary Resettlement Policy (April, 2013)

¹⁵ source : NSW Spatial Services

Stages of Planned Relocation

The international guidance on Planned Relocation generally characterised the stages of the Planned Relocation shown in Figure 2. This follows from the decision to proceed to Planned Relocation, through the planning process, implementation of the Planned Relocation and then the ongoing support for integration of the community into their new location.

Buy-Back schemes generally follow a similar process, although the integration component in the case studies reviewed is often left to the responsibility of individuals.

One feature of compulsory purchase schemes for infrastructure is that there may be a premium paid for the purchase of the affected property (in addition to transaction costs such as stamp duty exceptions and conveyancing costs etc.). This premium assists the resident in finding a suitable alternative property. In essence, this provides a financial compensation for the integration component.

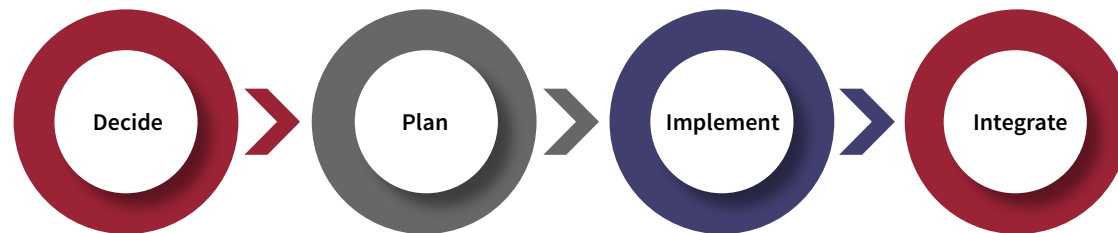


Figure 2. Stages of Planned Relocation

Measures of Success

One of the themes identified from the case studies and stakeholders were the different perspectives as to whether a Planned Relocation Scheme had been successful or not. In some cases, while a scheme may have been identified as successful at removing properties from high-risk areas, other perspectives may have identified lower performance on community-based indicators (such as support for lower socio-economic communities).

These differences in opinion largely come from the different stakeholder perspectives on an issue as well as their responsibilities. It highlights the need for clear objectives and performance indicators to be defined in a Planned Relocation Scheme that can then guide the development of appropriate planning.



Lismore (NSW) during 2022 Floods¹⁶

Community involvement throughout the Planned Relocation process, from decision and planning through to implementation, is key for the successful implementation. However, the community issues and needs can be highly complex, and location specific.

Community Issues and Themes

The scope of this discussion paper is not to provide an exhaustive list and overview of the community issues, or to provide solutions or strategies. Rather, the intention is to highlight some of the key themes and issues that were identified in the fact finding so as to inform subsequent strategies and investigations. A summary of these community themes and issues is provided in Table 2.

Community Participation

The level of community participation in a Planned Relocation Scheme is dependent on the combination of the issues and themes identified in Table 2. For example, the balancing between a Sense of Place and the Perception of Risk, together with affordability, can all interact to drive the level of participation of the community in the scheme planning and implementation.

A common theme was also ‘options and choice’, and that this was preferred over compulsory

schemes, limited option or limited timeframe schemes. IFRC (2021) explores the concept of voluntary and forced relocations. It specifically identifies that the decision to relocate, whether it be by a formal scheme or otherwise, is often not entirely voluntary. They suggest that it should be considered more on a spectrum:

voluntariness exists where space to choose between realistic options still exists. ‘Forced’ on the other hand characterizes situations where realistic options to choose from are no longer available. Thus, we can speak of voluntary movements where the element of choice is preponderant, whereas displacement or forced relocation takes place where the space for choice is [more limited].¹⁷

We would also suggest that the reverse is true, that the decision to remain is not always entirely voluntary, as factors such as affordability, housing availability and employment can all affect realistic options available to an individual.

¹⁶ source : Cloudcatcher Media/ Shutterstock.com

¹⁷ Warner et al (2013), as quoted in IFRC (2021)

For example, many high-risk flood affected communities perform poorly on socio-economic indicators (such as the sample locations discussed in the **Feasibility Assessment**). The same factors that can affect these community's ability to respond and recover from a disaster event, can also affect their ability to participate in a Planned Relocation Scheme.

Impacts

Often the focus of the community impacts and engagement is on the community that is being relocated, but there are also a number of other affected community stakeholders. As identified in IFRC (2021), these stakeholders may include:

- **Host Communities** - Being the communities accepting the relocating people
- **Those who Remain** - People who chose not to relocate;
- **Indirectly Affected** - This includes people who are located nearby to the existing location of the relocating community. For example, businesses may lose trade, or the relocation of essential services may impact on existing residents. This may also include residents who may have "missed out" on the Planned Relocation Scheme (e.g. their risk is determined to be lower).

Social Infrastructure and Support

There was an absence of formal social infrastructure and support for the majority of Planned Relocation Schemes that were reviewed for this paper. While the majority of the schemes reviewed appeared to focus on the removal of people and property from high-risk areas, less focus was placed on the community support to both relocate, and the subsequent integration of the relocated community members (whether it be a buy-back scheme or community relocation). Given the complex issues and themes identified in this paper, the need for this support is particularly important to ensure appropriate participation in any Planned Relocation Scheme.



Christchurch (NZ) – Remains of a building damaged from the 2011 earthquake¹⁸

¹⁸ source : Nigel Spiers/ Shutterstock.com

Diversity of Views & Public Support

Communities and different stakeholders will often have a diversity of views, and this can lead to challenges in the implementation of Planned Relocation.

For example, diversity of views from the community toward adaptation was identified as a key constraint to the implementation of sea level rise adaptation policies, such as Planned Relocation, based on research in Barwon Heads in Victoria¹⁹. Scally & Westcott (2011) argued that greater communication and education was needed, together with place-based research.

In addition to diversity of views, in many instances Planned Relocation in general is not favoured over alternative options. For example, in an extensive international literature review on coastal adaptation and public perceptions²⁰, it was identified that retreat options were the least preferred²¹. In particular, opposition to Planned Relocation was most frequently related to entitlement to property rights as well as place attachment. Place attachment was wide ranging, and might include emotional aspects, aesthetic aspects, heritage aspects, social aspects and other cultural considerations.

While significant effort will be needed in community education and engagement, it may not be possible to align all community and stakeholder views on Planned Relocation. Consideration will be needed on these differing viewpoints and how this may be accommodated within guidance documents, resource allocation and site specific planning and implementation.

Equity

Equity is an important consideration in Planned Relocation. This can come at the local community level up to the wider public interest.

Planned Relocation Schemes generally have criteria on the eligible residents, which is informed by various risk criteria. For example, the New Zealand Christchurch house purchase scheme included a “red zone” which was deemed to be high risk and therefore eligible for the buy-back.

Consideration is required for the remainder of the community who may not be eligible for the scheme, but who are still within the natural hazard area. While their risk may be lower, this can leave a perception of equity issues within a community.

A tiered scheme, where those not eligible for relocation may be provided with improved resilience (e.g. house raising or retrofitting), may partially address this. The Qld and NSW Resilient Homes funds are adopting this type of approach. However, there may be some residual equity issues associated with not being removed from the flood-zone or broader negative public perceptions.

More broadly, public perception does not always favour public expenditure on buy-back schemes. For example, there can be a public perception that Planned Relocation Schemes can benefit those who may have “chosen” to live in a high hazard area, or that the money could be expended in other ways for a broader benefit.

¹⁹ Based on Barnett et al (2013) review of Scally & Westcott (2011).

²⁰ The literature review included over 90 papers, covering Australia and international references.

²¹ Malette et al (2021)

Under both scenarios, emphasising the broader benefits of Planned Relocation on the wider community may assist in engaging with these stakeholders. These benefits include:

- Emergency Services – the removal of people from high-risk areas reduces the need to deploy emergency service personnel in high-risk situations.
- Reductions in Hazard – the removal of properties can provide the opportunity to reduce the hazard on surrounding properties (for example, an improvement of the capacity of the floodplain).
- Improved Public Amenity – in some cases, the rehabilitation of the land post-retreat can provide the opportunity for public open space and other uses that can benefit the wider community.

First Nations People

Connection to Country is a significant determinant of health and wellbeing for Australia's First Nations people and is a part of their self-determination. Connection to Country along with a range of other values and issues specific to First Nations people will require close consideration in any Planned Relocation planning and implementation.

A well designed Planned Relocation Scheme that ensures ongoing access to Country and support for social and economic barriers may be well received by some First Nations people. For example, a study of First Nations People in coastal communities in Arnhem Land²², suggested that 58% of respondents would consider participating in a relocation for future safety reasons. However, there remained a diversity of adaptation preferences amongst those consulted.

This paper does not attempt to undertake a detailed review of the likely engagement required, but rather highlights that this is an important issue to be considered.



Brisbane (Qld) during January 2011 Floods²³

²² Zander et al (2013)

²³ source : Brisbane/ Shutterstock.com

Table 2. Community Themes

STAGE	THEME	DISCUSSION
Decision and Planning	Perception of Risk	<p>The perception of risk within the community can affect the level of participation in a particular scheme. This perception of risk can be heightened following a significant event. In Christchurch, for example, the successive earthquakes, significant damage and loss of life, increased the perception of risk. However, the perception of risk may be lower if a hazard event has not occurred for many years.</p> <p>A further consideration is the perceived risk of moving elsewhere, as identified in IFRC (2021). This may relate to some of the issues identified in this table (e.g. affordability) as well as numerous other community and social issues.</p>
	Sense of Place	<p>A strong sense of place and/ or community can result in a resistance in community willingness to relocate. In a literature review provided by the Red Cross²⁴, a strong sense of place can result in an unwillingness to relocate, both during and then after a natural hazard event. Further, the process of relocation can result in a significant loss of place value, having further psychosocial impacts.</p>
	Approach to Engagement	<p>The approach to engagement with the community, and how the community is involved in the decision and planning, is particularly important.</p> <p>Terminology can also be important. For example, stakeholders identified that during disaster events, militaristic (e.g. "fight" and "defend) and community bonding (e.g. "community resilience") terms are often used. This contrasts with terms such as "retreat" which is often used for Planned Relocation, which is seen to be a "defeat".</p>
	Post-Event Trauma	<p>When a Planned Relocation Scheme is considered following a natural hazard event, consideration of the psychosocial impacts of an event on the community is required. Stakeholders identified that decision making following traumatic events can be problematic, given that individuals may not be in an appropriate position to make these decisions.</p>

²⁴ Evidence Summary – Planned Retreat and its Psychosocial Impacts, provided by Red Cross, October 2022.

STAGE	THEME	DISCUSSION
Implementation	Flexibility/ Options	A key theme identified by stakeholders was the need for choice and options in a Planned Relocation Scheme, given the differences in circumstances for different individuals. For example, the flexibility for an individual to relocate their house to the new site, if feasible, rather than the construction of a new home only. The general perception being the more rigid the scheme, the lower the participation.
	Affordability	<p>Affordability of the different schemes in the case studies was a key issue. In flood affected areas, for example, often the lowest cost housing is within the highest risk areas. Under a buy-back scheme, unless there is sufficient equivalently priced housing stock, then the ability of many people to relocate becomes a significant issue.</p> <p>Similarly, in the Grantham relocation scheme, property owners were required to undertake and fund the construction of their dwellings on the new lots. This can lead to affordability issues, particularly following a disaster event where individuals may already be under financial stress.</p> <p>A further consideration is the displacement of tenants. While many schemes focus on the property owners, the displacement of tenants, particularly where similarly affordable dwellings may not exist in an area, becomes a challenge.</p>
	Timeframes	The timeframe and agility of the various schemes was raised as a particularly important consideration. For example, some of the existing Voluntary Purchase schemes were identified as having relatively long lead times, between when a resident identified the desire to sell the property, and when the funding would be approved. This often led to residents selling their property to another party, and therefore continuing the risk in the community.
	Community Needs	Stakeholders identified those vulnerable community groups such as the elderly and people with disabilities, to be a specific consideration for Planned Relocation. While these populations are often the most at risk from a natural hazard, there can often be many social barriers for these communities to relocate. Specific social support is needed for these communities to relocate and integrate into new areas.
Integration	Social Infrastructure/ Support	<p>While in many cases there are general welfare provisions in Australia, specific social support for Planned Relocation Schemes was generally not identified in the case studies that were reviewed.</p> <p>The various international guidelines clearly identify both the integration for the relocated community, as well as the community that receives the relocated residents, as being important parts of the overall relocation process.</p>

Policy Mechanism

There are a number of examples of different policy mechanisms that have been adopted for Planned Relocation. Largely, a voluntary approach or “opt-in” approach has been adopted in the case studies reviewed. This requires people to voluntarily participate in the scheme. However, “voluntariness” can be considered on a potential scale.

Some examples of approaches that can be adopted:

- Voluntary scheme, owner can elect to sell to the government or another private party;
- Voluntary scheme, but the government has sole rights to purchase the property (i.e. it cannot be sold to another private individual);
- Voluntary scheme, but the scheme reverts to a compulsory scheme once a trigger point has been realised (for example, erosion of land reaches a trigger point).
- Fully compulsory scheme. Generally, these have less support in the community, although it depends on the hazard and the risk exposure.

The timeframes for the operation of the policy are also a consideration. Many of the case study schemes had a particular timeframe associated with them (e.g. over 1 year). However, stakeholders indicated that, particularly following a significant natural hazard event, that the community may require time to make appropriate decisions. From a community perspective, it was generally the consensus that more time was better than less time.

Pre vs Post Event Retreat

Planned Relocation can occur before or after a natural hazard event. Often, a recent natural hazard event can trigger an increased understanding of the risk within the community, and therefore drive associated risk mitigation strategies including Planned Relocation. The recently announced NSW Resilient Homes Fund, for example, can be attributed to the flooding on the east coast of NSW in 2022.



New Orleans (USA) – Vacant Land left behind after buildings were damaged by the levee breach²⁵

²⁵source : Brian Nolan/ Shutterstock.com

Pre-emptive (or sometimes called proactive or anticipatory²⁶) relocation by comparison, occurs before an event, although often there may have been a history of natural hazard events that may increase the understanding of the underlying risks. Pre-emptive relocation can allow for appropriate planning for the scheme, which provides greater flexibility including undertaking subdivisions, for example, as part of a Planned Relocation. If a natural hazard event occurs once a pre-emptive Management Retreat scheme is already in place, participation may increase in response to the increased awareness of the risk.

Post-Event relocation, is most effective if undertaken relatively shortly after the event. This is to ensure that reconstruction and rehabilitation of damaged dwellings does not occur prior to the scheme being implemented. This requires an agility in a Planned Relocation Scheme that is difficult to achieve unless there is existing government infrastructure to support it. For this reason, post-event relocation is usually better undertaken through Buy-Back schemes rather than Community Relocation.

Unless a current subdivision is available in which the government can purchase land, generally longer lead times are required for Community Relocation.

The process will require the identification of land for a subdivision, and then the subsequent subdivision process. This overall process may take a number of years to implement, unless accelerated approvals and processes are undertaken. This also does not include the construction of the dwellings, which will take further time.

In either Community Relocation or Buy-Back Schemes, the ability to move quickly after a natural hazard event requires the appropriate government infrastructure, policies and frameworks to be in place.

Public Infrastructure & Services

The provision of public infrastructure and services to the area subject to the Planned Relocation needs to be considered. In some locations, the Planned Relocation may be relatively localised (only a few houses in a street) and therefore this may be less of a concern.

However, for larger areas of Planned Relocation, consideration should be given on the continued provision of services (such as power, water, sewer etc.) as people relocate away from the area. The removal of services will effectively force many in the community to participate in the scheme.



Christchurch (NZ) – Disused Road in the Red Zone²⁷

²⁶ IFRC (2021)

²⁷ source : C Levers/ Shutterstock.com

An option is to provide a timeframe or trigger point at which services will no longer be provided. For example, a timeframe of 20 years or when 90% of properties are vacated.

Management

Many of the existing Australian schemes reviewed are largely implemented at the Local Government level. For example, while the NSW Government provides majority funding, the NSW Voluntary Purchase Scheme for flooding is implemented at the Local Government level.

Many Local Governments do not have the capacity, scale or skill-sets to manage and implement a Planned Relocation Scheme. Skill sets required can include specialists in community engagement, property purchase and acquisition, land development and financing. Further, larger agencies would have the capacity to leverage off skills of implementing in other locations, as well as a broader range of potential financing options (refer to next section). Larger agencies will also be better equipped to coordinate the input of key stakeholders such as Government agencies, regulators and insurance agencies.

Therefore, a regional²⁸ or State / Territory Government agency (with appropriate funding) with clearly defined functions and powers may provide a more effective lead agency of a Planned Relocation Scheme, with Local Government representing a key stakeholder in the process.

Alignment

It is important that there is alignment at the different levels of government, to provide a consistent and coherent message to the community. This was identified as a key challenge in some of the Planned Relocation Schemes that were reviewed for this paper. This was highlighted, in a review of literature on coastal adaptation, where Barnett et al (2013) identified the conflicting priorities between State and Local Government in South-East Queensland as a key challenge to implementing Planned Relocation as a policy³⁰. Barnett et al (2013) similarly identified inconsistencies in core principals between State and Local Government as a key constraint to deriving sea level rise adaptation policies³¹.



Victoria 2022 Floods – cars mobilised by floodwaters²⁹

²⁸ For example, the QRA in Queensland.

²⁹ source : Adansijav/ Shutterstock.com

³⁰ Based on Barnett et al (2013) review of Abel et al (2011).

³¹ Based on Barnett et al (2013) review of Scally & Wescott (2011)

Funding

The funding mechanism for a Planned Relocation Scheme will need to have several key features:

- Agile - The need to be agile and responsive following a natural hazard event;
- Efficient - Efficient approval processes for buy-back schemes to ensure that properties can be purchased in a timely manner;
- Sustainable - Planned Relocation Schemes can take time, particularly allowing for community decision processes. Having sufficient and ongoing funding will be key to the success of Planned Relocation.

The funding allocation for a Planned Relocation Scheme should be commensurate with the risk and be informed by appropriate risk and economic assessments.

The cost of Planned Relocation can be high, particularly if implemented on a large scale. However, there are some opportunities for funding or partnering that can provide the opportunity to reduce the cost to government. Some examples of these are provided in Table 3.

Further Considerations in Delivery

There are a number of considerations in the delivery of a Planned Relocation Scheme. A summary of some of the key considerations are provided in Table 4.

Table 3. Financing and Funding

OPPORTUNITY	DESCRIPTION
Climate or Environmental Financing	The rehabilitation of the properties post-retreat provides the opportunity to establish higher value environmental assets. There is a growing capacity of private financing in this area. For example, there is significant interest in “Blue Carbon” and the finance available on the international market. Therefore, there may be opportunity to fund some specific elements of the rehabilitation under these types of private financing.
Partnering	<p>The purchasing of land and subdivision is not a typical government function. Therefore, there may be opportunity to partner with developers to undertake the subdivision process.</p> <p>It may be possible to reduce the overall government contribution to the subdivision by providing incentives for developers (for example, reducing levies or allowing increased densities).</p> <p>An alternative may be to undertake the subdivision for a large number of properties, and “reserve” a portion of these for the Community Relocation Scheme, such as what was done for Grantham (Qld). This would allow the government or private developer to recover some funds.</p>
Subsidised Financing	There may be opportunity for government subsidised financing for people being relocated. For example, to cover the construction of a new dwelling within a subdivision. This may reduce the overall long-term cost to government of implementing the scheme. However, care should be taken on the relative capacity for the community that is being relocated to be able to service such a financing facility.

Table 4. Considerations in the Delivery of Planned Relocation Schemes

CONSIDERATION	PLANNED RELOCATION TYPE	DESCRIPTION	PROPOSED RESPONSE
Housing Availability	Buy-Back	The availability of housing for relocated residents within the community should be considered. On the north coast of NSW, for example, there are increasingly higher property prices and relatively low housing availability ³² . This may lead to people having to relocate significant distances from their existing location.	Undertake a review of housing availability and ensure that there is sufficient existing and/or future capacity to accommodate the participants of the scheme. This may require liaison with the relevant planning departments to ensure that housing availability or capacity is increased in the medium term to accommodate displaced community.
Land Availability	Community Relocation	A challenge in many locations in Australia, particularly in the larger urban areas, is land availability for Planned Relocation.	Consideration may be required for the use of non-traditional areas for a subdivision. For example, could a portion of a state forest be viable, particularly if appropriate rehabilitation of the existing dwellings is undertaken for environmental purposes.
New Land Hazards	Community Relocation	The natural hazards associated with the new community relocation area should be considered. For example, relocation of a community from a floodplain should not then expose them to high bushfire risk.	Appropriate investigations are required to ensure that the risks from the natural hazards of the proposed relocation area are appropriately low.
Social Support -Alternative Housing	Buy-Back	Generally, buy-back schemes have typically focused on the property purchase only. However, as raised in the Community section of this document, social support for those participating in the buy-back scheme can improve the participation and the successful integration of participants in other communities. This may be in addition to Recommendation 2 (financial premium).	Provide social support for participants of the scheme to identify new housing locations

³² Northern NSW was already short of affordable housing supply, now they are desperate, news.com.au, Madelaine Achenza. Available at <https://www.news.com.au/finance/economy/northern-nsw-was-already-short-of-affordable-housing-supply-now-they-are-desperate/news-story/4257b823cac41719d2866460ea59e38d>

CONSIDERATION	PLANNED RELOCATION TYPE	DESCRIPTION	PROPOSED RESPONSE
Construction of New Dwelling/ Relocation of Dwelling	Community Relocation	<p>A community relocation scheme will generally involve a subdivision, and subsequent construction of a new dwelling or relocation of an existing dwelling to the new location.</p> <p>In both cases, there represents a cost associated with these works. In some cases, such as Grantham (Qld), this was the responsibility of the owner. However, this represents a relatively large upfront cost, particularly after a natural disaster where residents may be in greater financial distress.</p>	<p>Consideration for how the development of new dwellings, or relocations of the dwellings, will be paid for.</p> <p>If this is to be done by the participants of the scheme, then consideration for financing mechanisms to reduce barriers for participation.</p>
Demolition & Rehabilitation	Buy-Back / Community Relocation	<p>As the scheme is implemented, there will be a number of vacant dwellings that are “left behind”. The scheme should include the demolition of the dwelling following purchase.</p> <p>Ensure that there is a plan for the use of the land following the purchase. For example, the space could be used for environmental purposes or community open space. However, a key challenge remains the timeframes over which the scheme occurs. During this interim phase, there may be numerous dislocated spaces that may prove challenging to providing meaningful use.</p>	<p>Include demolition of vacated dwellings in the Scheme.</p> <p>Develop a masterplan for alternative uses vacated properties.</p> <p>Ensure that land is appropriately zoned (e.g. recreational space etc) following purchase or land swap.</p>

Feasibility Assessment

To assess the feasibility of Planned Relocation in a real-life setting, three riverine floodplains and one coastal estuary with residential settlements were selected for review. For sensitivity reasons, the location names are reported as:

- Representative Area 1 - Mid-North Coast, NSW
- Representative Area 2 – Central Victoria
- Representative Area 3 – North-East Queensland
- Representative Area 4 – North Coast NSW

The locations were selected as having relatively high flood risk, based on available information from IAG and other flood related data. For the purposes of this analysis, no alternative mitigation measures were considered for these areas. The Feasibility Assessment findings are summarised in this section, and reported in detail in **Appendix B**.

The assessment looked at key criteria that could inform decision making for Planned Relocation:

- Costs and economic benefits – the present value of costs and economic benefits over a 50-year period, using a discount rate of 5%³³
- Risk to life – the potential loss of life (PLL) per year in each location compared to the accepted threshold³⁴
- Affordability – the average annual damage amounts³⁵ compared to the median annual average household income in each location³⁶. This represents the potential costs associated with either insurance, or repairs where the property owner does not have sufficient insurance.

Costs

The costs of Planned Relocation were found to be highly variable depending on the design of the scheme (buy-back or community relocation); the location of the scheme due to the ranges in house and land prices across Australia; and size of the scheme where larger schemes (particularly community relocation) had economies of scale. To illustrate the spectrum of costs, Figure 3 provides an indication of the range of subdivision costs based on the total number of lots in the subdivision.



Figure 3. Subdivision Costs - Cost per Lot³⁷

³³ The NSW Treasury (2017) NSW Guide to Cost-Benefit Analysis recommends a social discount rate of 7%, with sensitivity testing at 3% and 10%.

³⁴ Typical threshold for loss of life adopted, including for dam safety (e.g. NSW Government, 2019). PLL estimated using draft methodology as outlined in NSW Government (2022)

³⁵ Based on IAG data for each location

³⁶ Based on Australian Bureau of Statistics Census 2021 information

³⁷ Enspire Solutions (based on sub-division projects within Sydney)

The costs of two Planned Relocation options were investigated:

- Buy-back – a scheme based on the purchase of high-risk properties (determined by flood risk ratings)
- Community relocation – a scheme based on the purchase and sub-division of vacant land and construction of new houses away from the floodplain for community resettlement.

At a high level, the type of costs of the two schemes can be divided into four categories:

- Property related costs – the purchase of at-risk properties (buy-back) and the cost of demolition (buy-back, relocation)
- Relocation costs – the purchase and sub-division of land for resettlement³⁸ and construction of new housing stock (relocation)
- Reclaimed land related costs – costs related to the remediation of surrendered land. For this assessment, it was assumed that the reclaimed land would be converted to public space (e.g. parkland)
- Transaction costs – the administrative costs related to the scheme. Transaction costs were not included in this analysis as they are likely to be transfer costs where resources are reallocated from one use to another, and hence are not considered an incremental cost to society.

The breakdown of costs identified for Representative Area 1 are shown in Figure 4 for a property buy-back scheme and Figure 5 for a community relocation scheme. The figures show that the property related costs and relocation costs are the largest cost categories.

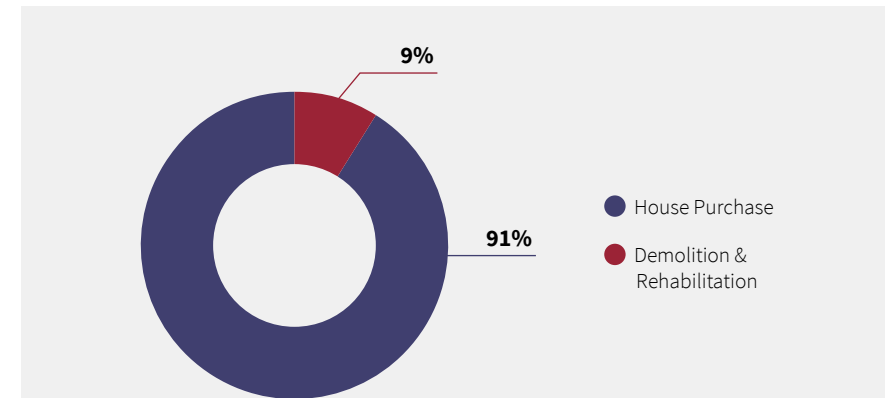


Figure 4. Indicative Cost Proportion - Buy-Back

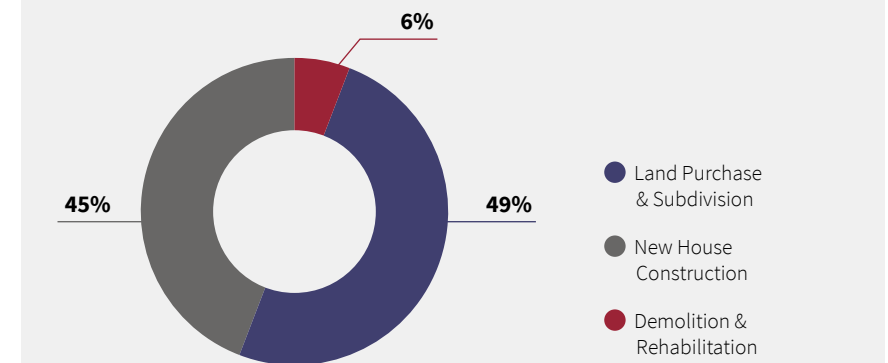


Figure 5. Indicative Cost Proportion - Community Relocation

³⁸ For the purposes of this assessment, it was assumed that where the number of properties for the Community Relocation was small, that it would be undertaken as a part of a much larger subdivision (at least 100 – 200 lots) and therefore there would be lower subdivision costs as per Figure 3

Economic Benefits

The economic benefits of Planned Relocation are largely attributed to avoided costs of a natural hazard event and the benefits created through the repurposing of surrendered land.

The economic benefits identified as part of this analysis were:

- Avoided annual damages (AAD) of residential property damage – the avoided damage costs to residential buildings.
- Avoided public infrastructure damage – infrastructure flood damage includes damage to public infrastructure such as roads, bridges and utilities (water, electricity etc), as well as parks and other recreation areas.
- Avoided public clean-up costs – the avoided costs of cleaning up flood related debris from public spaces.
- Avoided emergency response costs – the costs avoided incurred by emergency services in evacuating people from flood impacted areas.
- Avoided intangible costs – Intangible damages incorporate impacts to individuals and the overall community that typically do not have a market or dollar value. For example, these may include risk to life, flood-induced anxiety, depression etc. These have been presented as a range to reflect the different methods in estimating these values.
- Public space benefits - the repurposing of surrendered land can provide benefits to society either through improved health outcomes (use values), amenity outcomes (existence values) or environmental outcomes (improved biodiversity or capture of greenhouse gas emissions).
- Housing stock benefits – the increase in value of the newly constructed housing stock, compared to the depreciated value of the existing housing stock.

Given the overall range in potential costs as well as benefits, the economic results have been presented as a range to reflect this. Indicative benefits for Representative Area 1 are shown in Figure 6 and Figure 7.

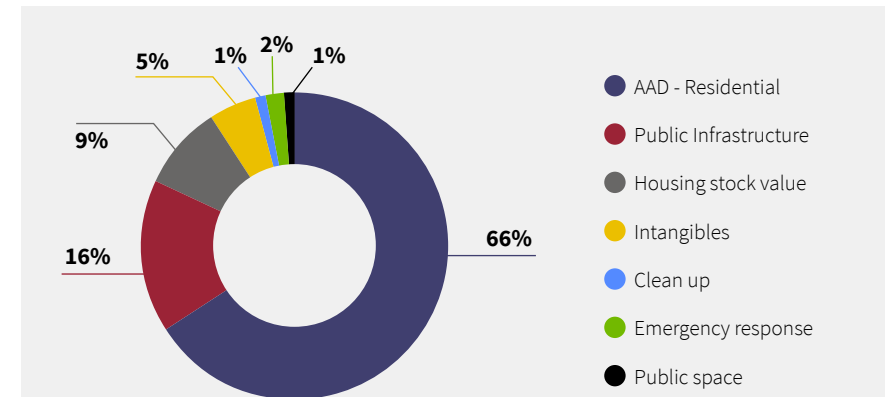


Figure 6. Benefits - Low Range Intangible Estimate

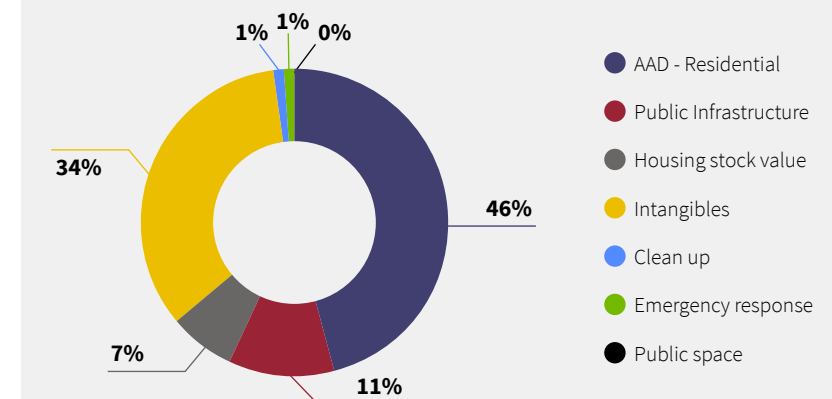


Figure 7. Benefits - High Range Intangible Estimate

There are a number of unquantified benefits in the analysis, and these are described in **Appendix B**. Of particular note is the place-based value for communities. Community Relocation has the advantage of keeping communities together, and this has not been incorporated into the analysis. Similarly, the challenges of housing supply under a buy-back scheme have not been included.

Risk to Life

An economic assessment is a useful tool for assessing the net cost to society of a particular Planned Relocation Scheme, however it is not the role of an economic assessment to define the tolerable level of a given risk. As such, Planned Relocation policy makers may also adopt risk to life criteria to assist in deciding when a given risk poses an unacceptable threat to human safety.

This analysis adopted the methodology for calculating risk to life that was used in the Rhelm (2021) *National Flood Hazard Mitigation Priorities Report*. The potential risk to life for each location was calculated for the 1 in 100 AEP³⁹ and compared to the acceptable threshold for loss of life of 1 in 10,000 that is typically used by the NSW Government for dam safety assessments and other hazard mitigation guidelines.

Outcomes

The key outcomes of the Planned Relocation assessment can be summarised as:

- The economic feasibility of Planned Relocation is highly dependent on the scale of the scheme and the annualised damage per dwelling in the location being assessed.
- In all locations the buy-back scheme represented a relatively more cost-effective option than the community relocation scheme. This is due to the relatively higher cost of land sub-division and house construction than the purchase of the equivalent number of properties. It is noted that this analysis did not attempt to quantify the economic benefit of keeping communities together (e.g. place based values) and doing so may increase the economic feasibility of community relocation schemes relative to buy-back schemes. Similarly, housing supply limitations were not considered in the buy-back schemes.
- Both schemes were generally viable for two of the representative areas (Representative Areas 1 and 3). These two locations had higher annualised average damages and impacts than the Victorian and North Coast, NSW example. Generally, it would suggest that Planned Relocation is viable in situations where the flood risk and potential damage to property is high.
- Representative Area 4 (North Coast, NSW) was selected as a case study area due to its susceptibility to future sea level rise, and resulting flood affection, due to the forecast impacts of climate change. The results show that while planned relocation may not be economically viable at present, a community relocation scheme does

become economically viable when delaying the scheme commencement until 2030. This is due to the increase in forecast average annual damages as flooding becomes more frequent and severe in future years.

- In all representative areas the possible loss of life was well above the typical acceptable threshold of 1 in 10,000. Depending on the priorities of Planned Relocation policy makers, this may be a key consideration.
- The affordability assessment provided a range of results, with AAD being equal to between 10% - 50% of median household income. In Representative Area 1 in particular the AAD was nearly 50% of the household income, suggesting very low affordability in that area for insurance or capacity for recovery from a flood event.

Further Considerations

The focus of this feasibility assessment has been on flood affected properties, although a similar assessment could be undertaken on other natural hazards.

Coastal based erosion and sea level rise may require further consideration, given that potential higher property prices in some areas of the country may limit the economic feasibility of Planned Relocation in these locations.



³⁹The potential risk to life was calculated for the 1 in 100 AEP, and expressed as a chance per year of a loss of life.

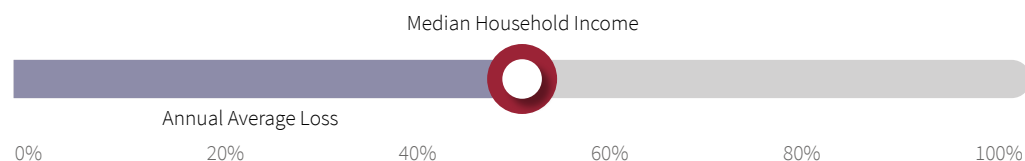
Representative Area 1 – Mid North Coast NSW

Overview

A township located on the east coast of NSW, on a large riverine floodplain. Extensive flooding of the community, even in relatively frequent floods (e.g. 1 in 10 AEP). Due to low lying nature of the area, most properties inundated to a similar extent.



The representative case study considers the Planned Relocation of the entire town.

	Total properties considered for Retreat (approx)	400
	Study area average annualised damage per dwelling	\$30,000
	Population (estimated)	1000
	Proportion of Properties affected in 1 in 20 AEP	100%
	Average Annual Household Income	\$60,000
	% of NSW Average Income	65%
	SEIFA Index ⁴⁰	1.0



Analysis Results

- The benefit cost ratio is above 1 for the Buy-Back Scheme. For Community Relocation, the results are generally above 1, although this depends on the costs of the land and subdivision.
- It is estimated that there is a 1 in 90 chance per year of a loss of life from flooding, which is significantly above the acceptable threshold.
- The average annual damages for a household for the area represent around 50% of the average household income, suggesting that affordability is low for recovery following a flood, or for insurance.

	Benefit Cost Ratio (Buy-Back):	1.4 – 2.5
	Benefit Cost Ratio (Community Relocation):	1.0 – 1.7
	Potential Loss of Life (chance per year) ⁴¹	1 in 90
	Acceptable Threshold ⁴²	1 in 10,000

⁴⁰ Socio-Economic Indexes for Areas (SEIFA) is an Australian Bureau of Statistics (ABS) product using Census information to rank Australian locations according to relative socio-economic advantage and disadvantage on a scale of 1 (disadvantaged) to 5 (advantaged).

⁴¹ Based on the 1 in 100 AEP event.

⁴² Typical threshold for loss of life adopted, including for dam safety (e.g. NSW Government, 2019)

Representative Area 2 – Central Victoria

Overview

A township located in Central Victoria, in a low-lying area on the banks of a major waterway. Extensive flooding of the community, even in relatively frequent floods (e.g. 1 in 10 AEP). Due to topography of township, properties are impacted to a varying extent.

The representative case study considers the Planned Relocation of the two worst affected ABS Mesh Blocks within the township.

	Total properties considered for Retreat	68
	Study area average annualised damage per dwelling	\$5,000
	Population (estimated)	170
	Proportion of Properties affected in 1 in 20 AEP	88%
<hr/>		
	Average Annual Household Income	\$60,000
	% of Victoria Average Income	65%
	SEIFA Index ⁴³	1.0

Median Household Income



Analysis Results

- The benefit cost ratio is below 1 for both the buy-back and community relocation schemes, suggesting in this case neither is economically viable and that alternative mitigation may be more appropriate. This is reflective of the much lower average damages and lower severity of flood affectation.
- It is estimated that there is a 1 in 260 chance per year of a loss of life from flooding, which is above the acceptable threshold.
- The average annual damages for a household for the area represent around 10% of the average household income, suggesting that affordability is higher than the other representative areas considered in this paper.

	Benefit Cost Ratio (Buy-Back):	0.4 – 0.5
	Benefit Cost Ratio (Community Relocation):	0.4 – 0.5
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	Potential Loss of Life (chance per year)	1 in 260
	Acceptable Threshold ⁴⁴	1 in 10,000

⁴³ Socio-Economic Indexes for Areas (SEIFA) is an Australian Bureau of Statistics (ABS) product using Census information to rank Australian locations according to relative socio-economic advantage and disadvantage on a scale of 1 (disadvantaged) to 5 (advantaged).



⁴⁴ Typical threshold for loss of life adopted, including for dam safety (e.g. NSW Government, 2019)

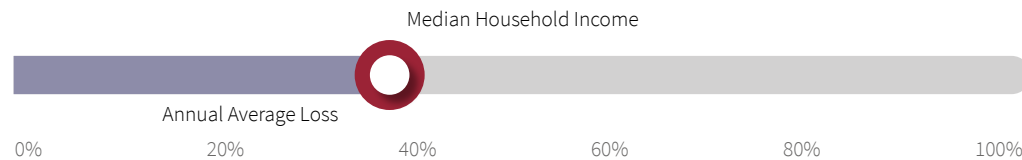
Representative Area 3 – North-East Queensland

Overview

A township located in North-East Queensland, at the confluence of two rivers. Extensive flooding of the community, even in relatively frequent floods (e.g. 1 in 10 AEP). Due to topography of township, properties are impacted to a varying extent.



The representative case study considers the Planned Relocation of the worst affected area within the township.

	Total properties considered for Retreat	27
	Study area average annualised damage per dwelling	\$20,000
	Population (estimated)	70
	Proportion of Properties affected in 1 in 20 AEP	100%
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	Average Annual Household Income	\$55,000
	% of Queensland Average Income	60%
	SEIFA Index ⁴⁵	2.0



Analysis Results

- The benefit cost ratio is above 1 for the buy-back scheme and community relocation scheme, suggesting both schemes are economically viable.
- It is estimated that there is a 1 in 500 chance per year of a loss of life from flooding, which is above the acceptable threshold.
- The average annual damages for a household for the area represent nearly 40% of the average household income, suggesting that affordability is relatively low for recovery following a flood event, or for insurance.

	Benefit Cost Ratio (Buy-Back):	1.3 – 2.1
	Benefit Cost Ratio (Community Relocation):	1.0 – 1.4
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	Potential Loss of Life (chance per year)	1 in 500
	Acceptable Threshold ⁴⁶	1 in 10,000

⁴⁵ Socio-Economic Indexes for Areas (SEIFA) is an Australian Bureau of Statistics (ABS) product using Census information to rank Australian locations according to relative socio-economic advantage and disadvantage on a scale of 1 (disadvantaged) to 5 (advantaged).



⁴⁶ Typical threshold for loss of life adopted, including for dam safety (e.g. NSW Government, 2019)

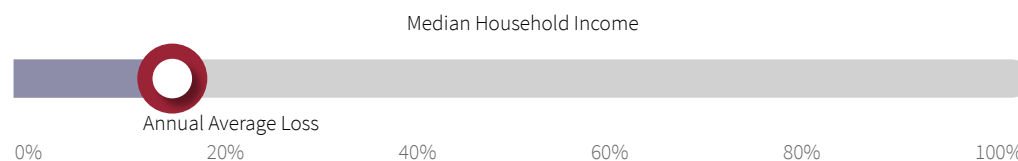
Representative Area 4 – North Coast NSW

Overview

A coastal suburb situated on an estuary, at risk of catchment and coastal flooding. It is particularly susceptible to sea level rise as a result of climate change, resulting in higher change in flood affectation in the future compared with the other representative areas. Due to low lying coastal nature of the suburb and proximity to shoreline, all properties inundated to a similar extent.



The representative case study considers the Planned Relocation of the worst affected area within the suburb.

	Total properties considered for Retreat	105
	Study area average annualised damage per dwelling	\$11,500
	Population (estimated)	250
	Proportion of Properties affected in 1 in 20 AEP	90%
	Average Annual Household Income	\$65,000
	% of NSW Average Income	85%
	SEIFA Index ⁴⁷	3.0



Analysis Results

- The representative area has greater impacts of climate change by sea level rise and rainfall changes compared with the other representative areas. An assessment was undertaken by delaying the commencement of the scheme until 2030. This results in a marginal-to-positive BCR for community relocation, due to the higher impacts of climate change.
- The Community Relocation (delay until 2030) BCR result supports the need for strategic planning for future risk mitigation.
- It is estimated that there is a 1 in 1,600 chance per year of a loss of life from flooding, which is above the acceptable threshold.
- The average annual damages for a household for the area represent nearly 15% of the average household income, suggesting that affordability may become lower over time as damages increase with the intensifying of climate change driven flooding.

	Benefit Cost Ratio (Buy-Back) – delay until 2030	0.2 – 0.3
	Benefit Cost Ratio (Community Relocation) – delay until 2030 ⁴⁸	0.8 – 1.0
	Potential Loss of Life (chance per year)	1 in 1,600
	Acceptable Threshold ⁴⁹	1 in 10,000

⁴⁷ Socio-Economic Indexes for Areas (SEIFA) is an Australian Bureau of Statistics (ABS) product using Census information to rank Australian locations according to relative socio-economic advantage and disadvantage on a scale of 1 (disadvantaged) to 5 (advantaged).

⁴⁸ Representative Area 4 is unique from the other three areas in that Community Relocation performs better economically. This is due to relatively high property prices, and is discussed further in Appendix B.

⁴⁹ Typical threshold for loss of life adopted, including for dam safety (e.g. NSW Government, 2019)

Recommendations

Following the above review and discussion, Table 5 provides a summary of the key recommendations from this paper.

Table 5. Recommendations

RECOMMENDATION	
1	<p>Develop national Guidance on Planned Relocation, outlining key guiding principles and processes for the Australian context. This should cover:</p> <ul style="list-style-type: none"> • Key objectives and performance indicators for Planned Relocation Schemes. • Models for Planned Relocation (e.g. buy-back and community relocation). • Guidance on the planning, decision-making, implementation, and integration phases. • Models for holistic community engagement, including specific considerations for First Nations People. • Consideration of vulnerable community members, including people with a disability and the elderly. • Guidance on land use planning and management, including the management of vacated land.
2	<p>Prioritise and fund integration support measures for relocated residents as part of Planned Relocation Schemes. For buy-back schemes this may come in the form of appropriate social support and/or financial support recognising additional relocation costs, while community relocation schemes should include appropriate physical and social infrastructure.</p>
3	<p>Planned Relocation should be coordinated by State Government agencies to centralise key skill sets and achieve appropriate economies of scale, while ensuring that Local Government remains a key stakeholder.</p> <p>Planned Relocation requires a coordinated and consultative approach across Federal, State and Local Governments.</p>
4	<p>Responsible agencies should proactively identify high-risk areas and develop Community Adaptation Plans prior to a natural hazard event occurring. This will allow for relocation to be pro-active before a natural hazard event occurs and/ or be implemented swiftly following a natural hazard event. Identification and prioritisation of high-risk areas should utilise risk data through a range of sources, including Local Government, State / Territory Government and other sources such as the Hazard Insurance Partnership.</p>
5	<p>Federal and State / Territory Governments should formalise funding arrangements, to ensure Planned Relocation Schemes can be adequately funded on an ongoing basis commensurate to the risk to life, property, and the economy.</p>
6	<p>Establish legislative framework for accelerated approvals for Planned Relocation, including re-zoning, subdivision and development approvals.</p>
7	<p>Review the outcomes of large-scale implementations of Planned Relocation (e.g. NSW and Qld Resilient Homes Funds) to inform development and refinement of National Guidance and frameworks. Continue to monitor the performance of schemes and ensure that guidelines are reviewed at regular intervals.</p>

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Cover image : Nearmap Imagery, 25 March 2021, near Windsor NSW

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