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Why risk tolerance matters: improving natural hazard risk decisions across policy and practice

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Key messages

- Risk tolerance is a key step between understanding natural hazard risk and deciding what to do about it.
- It is an explicit step that considers how much risk we are willing and able to bear, and the relative cost of inaction vs action.
- Explicitly considering risk tolerance highlights trade-offs and enables consistent, defensible decisions and efficient allocation of resources - without it, decisions become incoherent, resources are wasted, and public trust erodes.

Who is this brief for?

Policy professionals and risk practitioners.

Ad hoc natural hazard risk management

New Zealand faces significant exposure to natural hazards. We regularly make decisions about which risks to manage and which to accept. But we make these decisions implicitly, inconsistently, and without transparency. In particular, we are seeing:

- an over-reliance on conservative defaults or legal defensibility,
- decision paralysis or excessive precaution,
- assumption or value-based decisions.

This ad hoc approach produces variable outcomes across communities and sectors. This drives poor resource allocation, inequitable outcomes, culturally inappropriate actions, moral stress, and erodes public trust.

Clear, transparent, and objective processes to determine our risk tolerance are the key to better natural hazard risk reduction decisions.

> *Risk tolerance is about making the reasoning behind risk management decisions transparent.*

What is risk tolerance?

Risk tolerance is the step between understanding natural hazard risk and decisions to manage it.

It asks two key questions:

- What is our capacity and willingness to bear risk?
- When does the cost of inaction outweigh the cost of action?

Determining risk tolerance involves considering technical information alongside legal, organisational, financial, and social factors in a structured, transparent way.

What decisions involve risk tolerance?

Any time you decide which risks to reduce and which not to, you need to consider risk tolerance.

For example:

Land use planning – where is too risky for future development?

Coastal retreat – when is it too risky to stay? Recent examples include Matata, Amberley Beach, and South Dunedin.

Infrastructure design – how robust should we build our assets?

Tourism activities - when is it safe enough for tourists to be in a hazardous location? For example, the debate around tourist safety in Milford Sound.

Benefits of explicit / structured risk tolerance

1. Better decisions

- Makes value trade-offs explicit.
- Reduces ad hoc or reactive choices.
- Supports proportional responses.
- Better allocates limited resources.

2. Consistency and fairness

- Similar risks treated similarly.
- Clear rationale when outcomes differ.
- Reduces perception of arbitrariness.

3. Transparency and trust

- Decisions can be explained, not just defended.
- Communities understand why certain risks are accepted.
- Supports social license.

4. Organisational confidence

- Staff clarity on decision boundaries.
- Reduced internal conflict and second-guessing.
- Stronger governance.
- Reduced liability/legal defensibility.

5. Adaptive governance

- Risk tolerance can be reviewed and adjusted over time.
- Supports learning rather than blame after events.
- Risk tolerance supports justifiable decisions, makes trade-offs transparent and explicit, and reduces inconsistencies across decisions (including those hidden or unintended).

CASE STUDY
Better allocation of resources

Following the Canterbury earthquakes, the former Canterbury District Health Board (CDHB) faced the task of repairing and seismically remediating their building portfolio. Applying a single standard across all buildings, they quickly found they would exhaust their limited funds.

They asked themselves: 'What level of disruption would be acceptable across different buildings in our portfolio?' In response, they divided their buildings into four categories based on functional criticality and applied different performance criteria to each.

By being explicit about which risks to accept and which to manage, they redirected approximately **75%** of their original budget to their most critical buildings.

This case demonstrates that explicitly considering risk tolerance - rather than applying an arbitrary uniform standard - enables more strategic, defensible, and effective allocation of limited resources.

For more, see this paper in Earthquake Spectra.

Costs of explicit / structured risk tolerance

Risk tolerance processes can be scaled to fit the problem and the available resources. It can be as simple as a structured conversation within an organisation, through to an extensive community engagement process and technical analysis.

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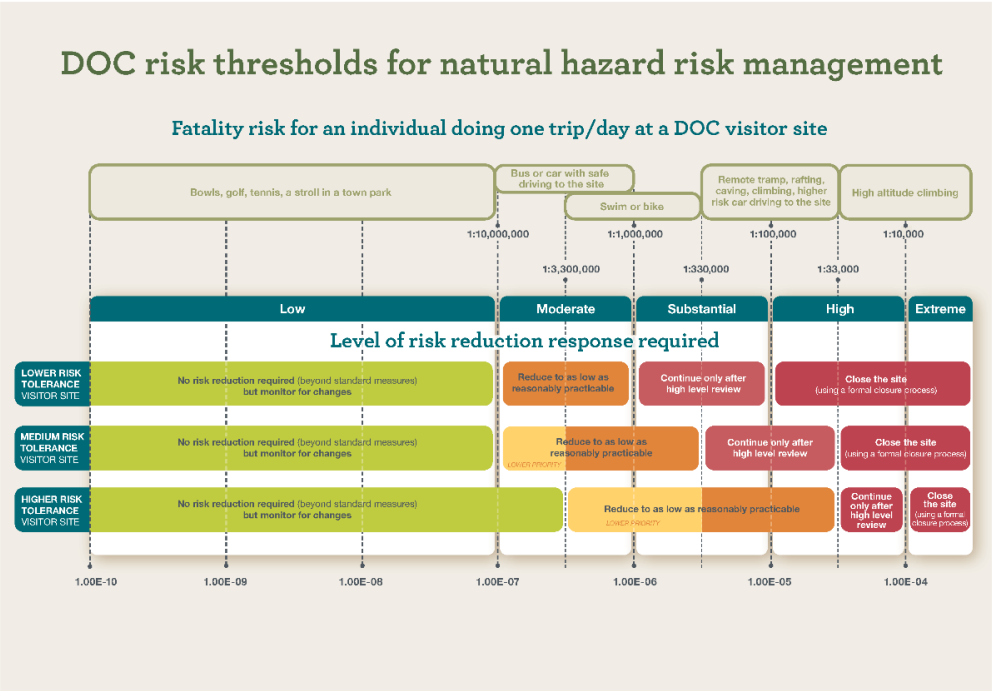
CASE STUDY
Proportionate asset management

The Department of Conservation (DOC) manages visitor sites across a wide spectrum of risk levels and outdoor activities. Rather than applying a single standard, DOC scales its management to the site: highly accessible sites are managed to low risk, while remote sites carry higher risk and less intervention.

DOC uses quantitative risk thresholds, developed from international benchmarks and accident data, tailored to the main visitor group at each site.

Risk management controls are only required when risk exceeds the threshold for that group. This approach allows DOC to manage risk consistently across the country while avoiding both under- and over-management, directing resources where they are genuinely needed rather than applying blanket mitigation that would be costly, environmentally damaging, and would diminish the visitor experience.

More information is available on DOC's website, [Assessing risk from natural hazards at visitor sites.]



CASE STUDY
Building trust through risk tolerance

The Wharekawa Coast, a 20km stretch of North Island coastline, faces coastal inundation, erosion, and flooding under a changing climate. Rather than applying a single management standard across the entire area, Waikato Regional Council and partner councils worked with the community to explicitly define what level of risk was tolerable, and when. Using surveys and risk matrices, residents indicated how frequently they could accept impacts across five categories including homes, roads, and services. The resulting thresholds revealed that some areas had already exceeded community tolerance, prompting immediate mitigation, while others had decades before action was required.

By making risk tolerance explicit and involving the community in the process, councils built trust with the community and collectively developed a plan that could direct resources to areas of greatest need and justify a "status quo" approach elsewhere, rather than spreading limited funds thinly across the entire coast.

For more, see the [Wharekawa Coast case study.]

CASE STUDY
Making risk ownership clear

In December 2019, Whakaari/White Island, New Zealand's most active volcano, erupted while 47 tourists and guides were on the crater floor. Twenty-two people died, and 25 were seriously injured.

A WorkSafe prosecution subsequently found that Whakaari Management Limited (WML), which licensed commercial access to the island, had never conducted an adequate risk assessment. Risk decisions were ad hoc and informal, with WML, GNS, tour operators, and civil defence each assuming others were managing the risk. Crucially, no one had explicitly asked what level of volcanic risk was acceptable for the thousands of tourists visiting annually. Thirteen parties faced prosecution.

The tragedy illustrates the devastating human, legal, and reputational consequences when risk tolerance decisions are left implicit, and accountability is diffused across agencies with no single party owning the question.

Getting started

There are some great resources already available to support organisations in taking a structured and explicit approach to risk tolerance. These are a good place to start.

- NHC's risk tolerance methodology provides a step-by-step process to integrate risk tolerance into risk management decisions.
- The Let's Talk About Risk Tolerance guidance provides advice on how to capture public perspectives on risk tolerance.

Both resources include useful case studies on how to approach risk tolerance.

Recommendations

- Socialise the concept of risk tolerance within your organisation.
- Develop processes for structured risk tolerance considerations, drawing on available resources.
- Sign up for updates on the latest risk tolerance cases and resources.

Looking ahead

We know that more support is needed to ensure risk tolerance is considered in natural hazards risk management decision-making.

The Risk Tolerance Working Group is building a set of resources to help organisations to better navigate risk tolerance decisions. With a particular focus on:

- Socialising risk tolerance concepts and language.
- Developing principles, guidance, and tools.
- Building a resource library and exemplar case studies.
- Exploring how risk tolerance is applied in different contexts.
- Building capability.
- Embedding risk tolerance in policy and planning.

Further reading

- Working group workshop report
- Policy Brief: Using risk comparisons to support natural hazard risk management

Risk tolerance enables better decisions in a future of increasing uncertainty and resource constraint

Get in touch
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About the series: This policy brief was produced by the Risk Tolerance Working Group, a collection of professionals from across agencies, consultancies, and universities, who collectively seek to increase the uptake of risk tolerance, particularly for decisions on natural hazard risk.