

# **Guidance Sheet No. 5: Risk Assessment Processes**

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## 1. Introduction

A risk assessment aims to analyse threats and identify the hazardous events they can trigger. All kinds of events should be considered, known or unknown. Following this, the potential risks can be evaluated along with their consequences and probabilities. It is also important to evaluate which risks can be acceptable or what can be done in order to be acceptable (Parra et al., 2018). Risk assessment provides a basis for decisions about the most appropriate approach to be used to treat the risks. The output of risk assessment is an input to the decision-making processes of the organization and can be used for both internal and external stakeholders.

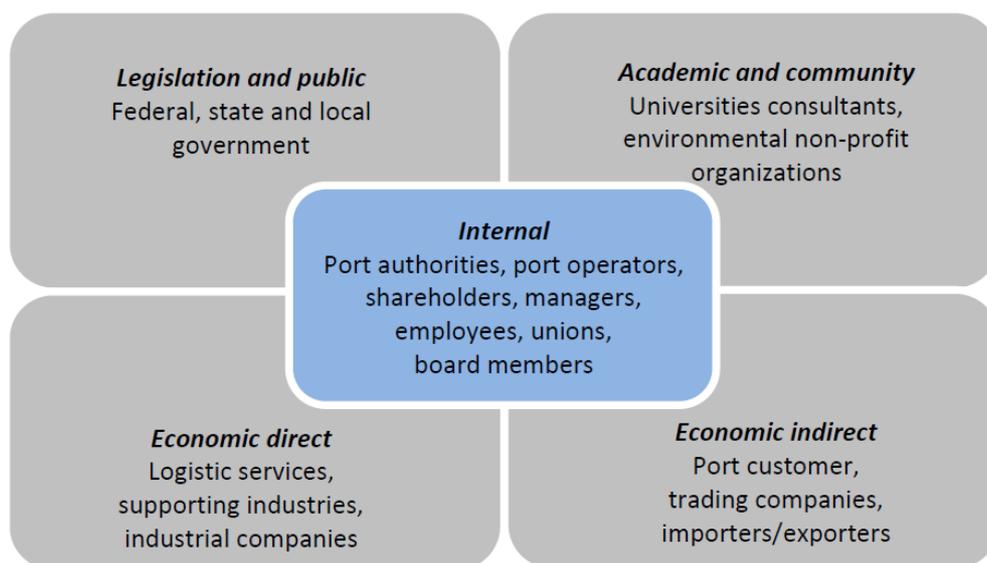


Figure 1 - Stakeholder categorisation of ports, from (Parra et al., 2018)

## 2. Benefits of conducting a risk assessment

- Understanding the risk and its potential impact upon objectives
- Providing information for decision makers
- Contributing to the understanding of risks, to assist in selection of treatment options
- Identifying the important contributors to risks and weak links in systems and organisations
- Comparing of risks in alternative systems, technologies or approaches
- Communicating risks and uncertainties
- Assisting with establishing priorities
- Contributing towards incident prevention based upon post-incident investigation
- Selecting different forms of risk treatment
- Meeting regulatory requirements
- Providing information that will help evaluate whether the risk should be accepted when compared with pre-defined criteria.

### 3. Definitions

Table 1 - Risk assessment definitions from CoastAdapt ([www.coastadapt.com.au](http://www.coastadapt.com.au))

Variable	Definition
Risk	<b>Risk is the potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values.</b> Risk is often represented as probability of occurrence of hazardous events (likelihood) or trends multiplied by the impacts (or consequences) if these events or trends occur. Risk results from the interaction of vulnerability, exposure, and hazard (IPCC 2014). As an example, as sea level rises, increased frequency (likelihood) of inundation (a hazard) of an area during storm event can put the structural integrity of a nearby infrastructure, such as road into a risk.
Hazard	In the context of climate change, <b>hazard refers to any potential occurrence of a natural or human-induced physical event that may cause damage to property, infrastructure, livelihoods, service provision, environmental resources</b> etc. As an example, as sea level rises, increased frequency of inundation of an area during storm event is a potential hazard for a low-lying coastal community.
Exposure	<b>The degree to which a system is exposed to a given hazard</b> (e.g. sea-level rise). As an example, a coastal community in a low-lying area can be exposed to certain degree of hazard of inundation during a storm event.
Vulnerability	<b>The propensity or predisposition to be adversely affected.</b> Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (IPCC 2014). As an example, older populations are more sensitive to heat-stress and have limited physical capacity to adapt, therefore highly vulnerable during a heatwave.
Sensitivity	In the context of a risk assessment, the term <b>sensitivity refers to the degree to which a system is affected by, or responsive to a hazard.</b> In other words, sensitivity captures the potential of a system to be impacted by a hazard. Sometimes sensitivity is determined by the criticality of the service that the system provides. For example, a community uses a road located close to the low-lying area of the coast as its main access to a major hospital. In the past, this road has been inundated during a storm event making access to the hospital difficult. Because the hospital provides such an essential service, this community should be considered more sensitive to coastal inundation event.

### 4. Strategy

- Climate change adaptation is highly context specific, so generic adaptation actions cannot be adopted without appropriate site-specific investigation (McEvoy et al, 2013). For this reason, port authorities should undertake a location-specific climate risk assessment, noting that there is not one 'correct' way to conduct climate change assessments.
- In general climate risk assessment is one component of the wider climate adaptation strategy (Figure 2) and the two are closely intertwined. These assessments advocate a variety of methods and are usually multi-sector, where ports are usually included as a sub set of the transport or coastal sectors.

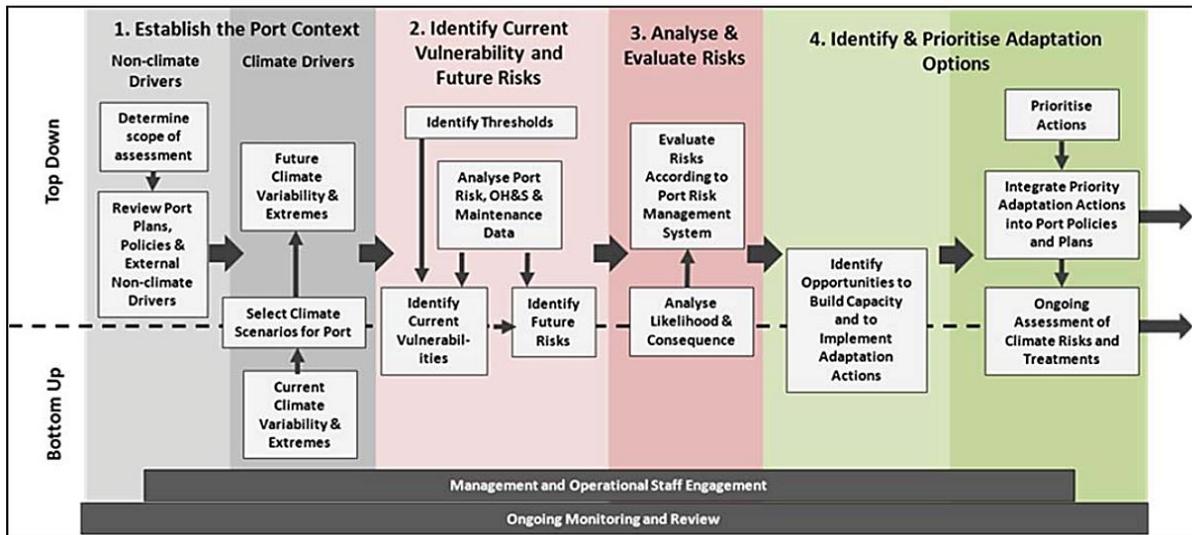


Figure 2 - Adaptation/risk assessment process for ports (McEvoy et al., 2013)

Sources:

- [www.coastadapt.com.au](http://www.coastadapt.com.au)
- McEvoy, D, Mullett, J, Millin, S, Scott, H & Trundle, A. Understanding future risks to ports in Australia. Work Package 1 of Enhancing the resilience of seaports to a changing climate report series, National Climate Change Adaptation Research Facility, Gold Coast (2013).
- Parra, N. M., Nagi, A., & Kersten, W. RISK ASSESSMENT METHODS IN SEAPORTS, 2018