Impact-Based Forecasting Impact Tables

Developing Impact Tables

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Aim

To introduce the concept of **Impact Tables** within an Impact-based Forecasting (IBF) approach to early warnings and support delegates to develop impact tables with key stakeholders during National Demonstration Workshops.

Objectives

By the end of this session delegates will have had the opportunity to…

- Describe what an impact table is
- Explain the role of impact tables within an IBF service
- Summarise the process involved in creating impact tables
- Describe the process of collaboration required to produce them
- Give examples of information which might be included in impact tables
- Compare and appropriately classify the impacts of weather hazards within impact tables

What is an impact table?

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Why do we need impact tables?

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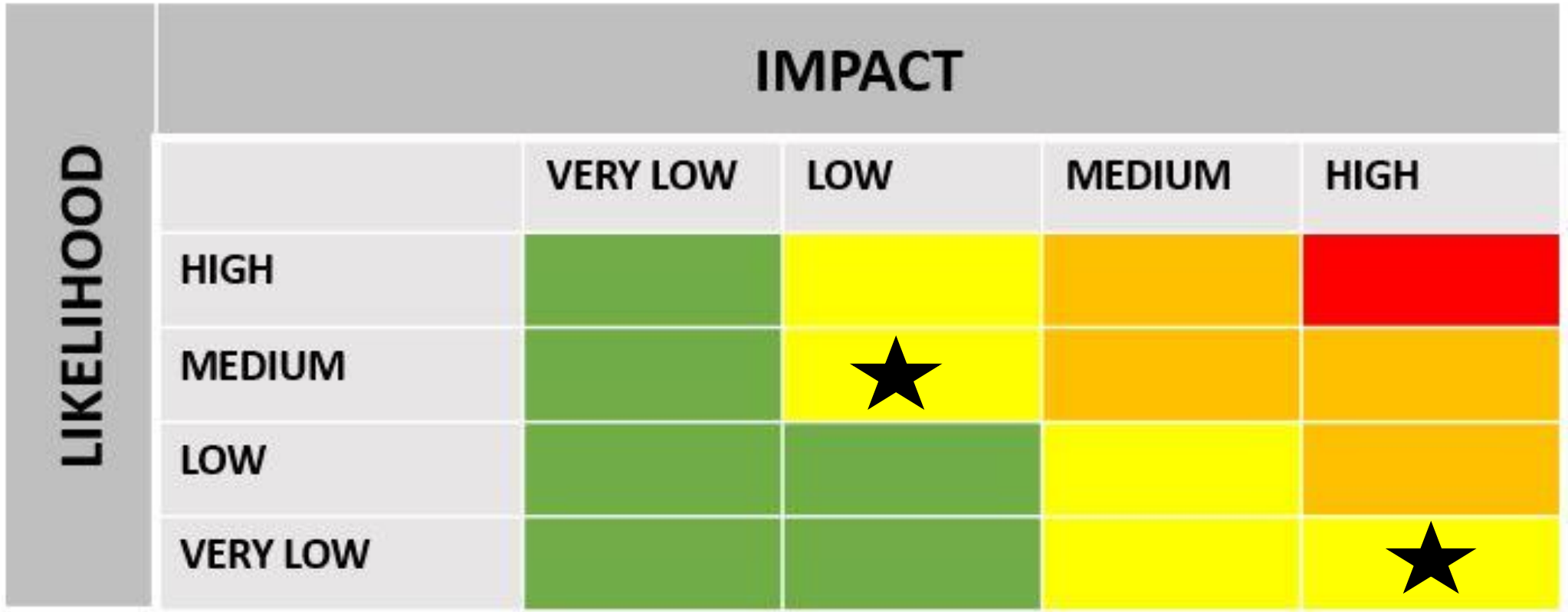
Risk Matrix & Impact Tables



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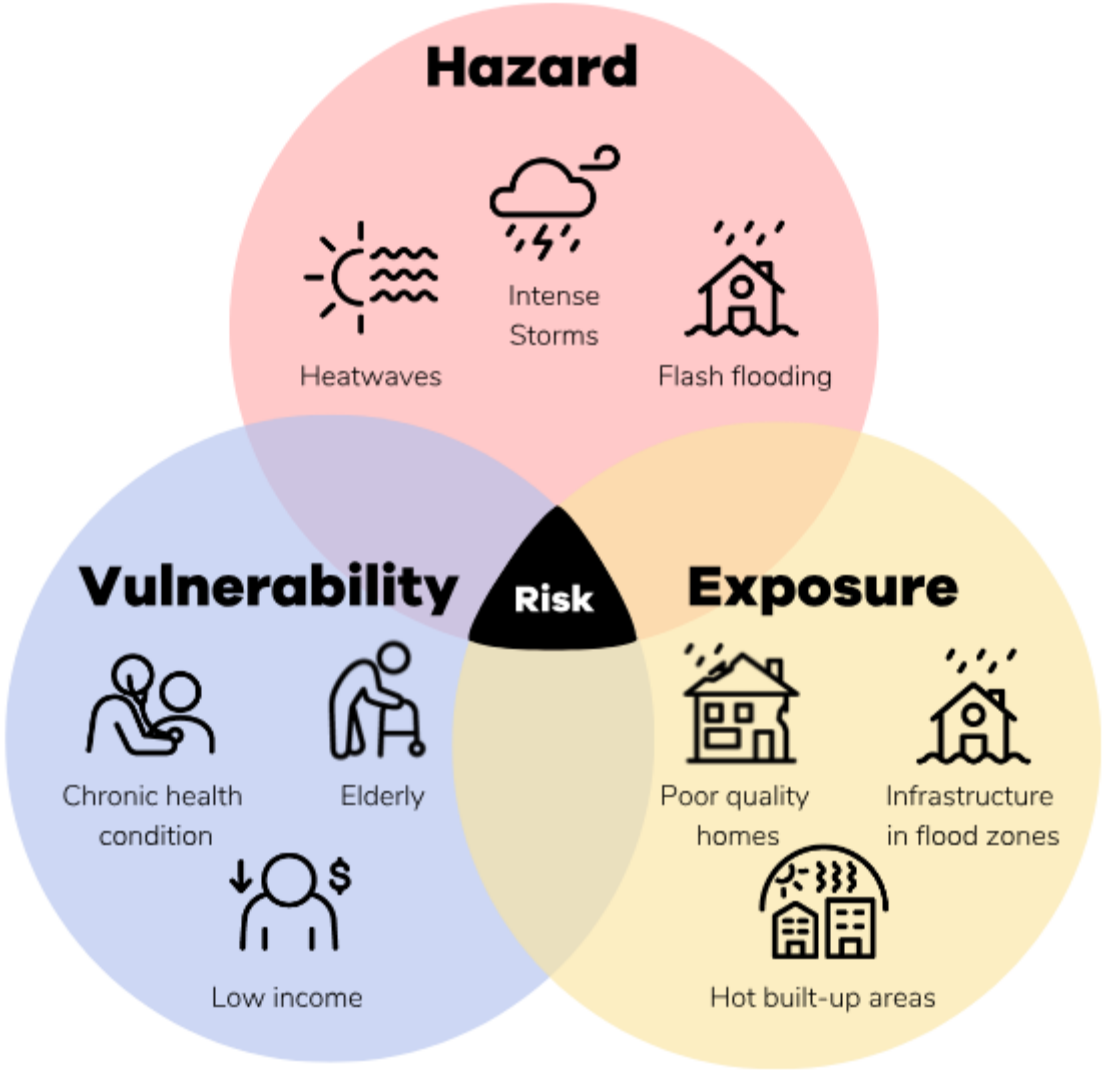
What is IBF forecasting?

- An Impact-based Forecasting system doesn't assess (or forecast, at least solely) the likelihood of an event occurring, but rather the **likelihood of a given hazard to cause impacts at the level forecast**.
- While NHMSs may be able to assess the likelihood of the event (which is still important, as without it we wouldn't need to think about potential impacts), to understand impacts they must **work collaboratively with relevant stakeholders**.
- This includes in the initial defining of impacts at various levels, and iteratively to understand how **vulnerabilities** are increasing or decreasing over time (which will help determine the overall level of risk given any event).

IBF Recap

Impact-based Forecasts & warnings consider the (hydrometeorological) **hazard**, the **vulnerability** and **exposure** of people (which can be dynamic) and places, assets and infrastructure.



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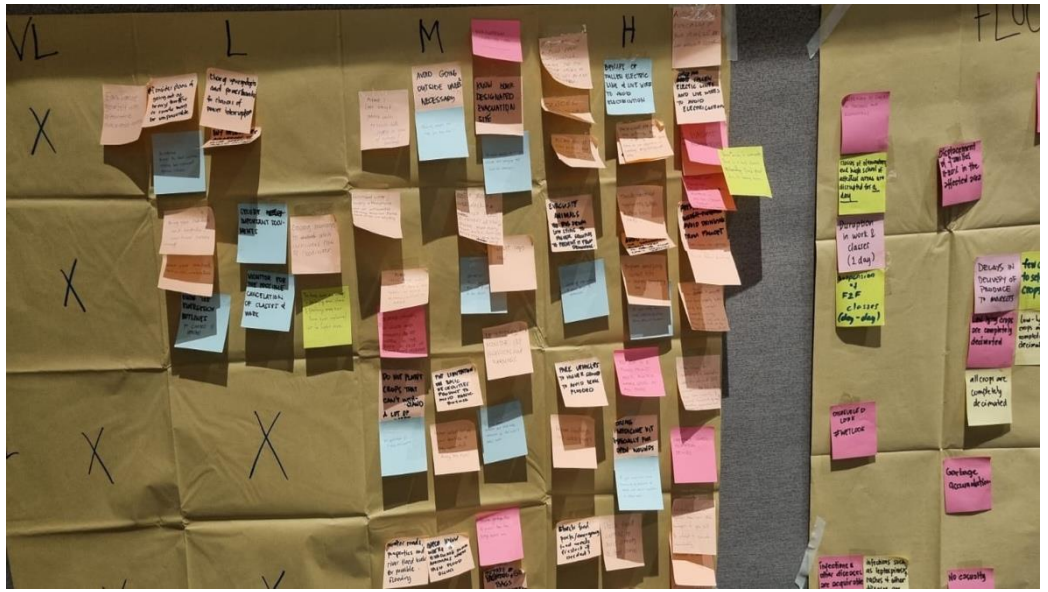
Constructing Impact Tables

Constructing Impact Tables

- Impact tables ***cannot and should not*** be developed by NHMSs alone.
- They should be produced in collaboration with key stakeholders, from sectors impacted by the hazard for which they are being developed and have experience of being impacted.
- It's often an iterative process, both in the initial design, and through implementation.
- Define, and adjust, *"thresholds"* for specific hazards and locations (we will come to this later in the week!)



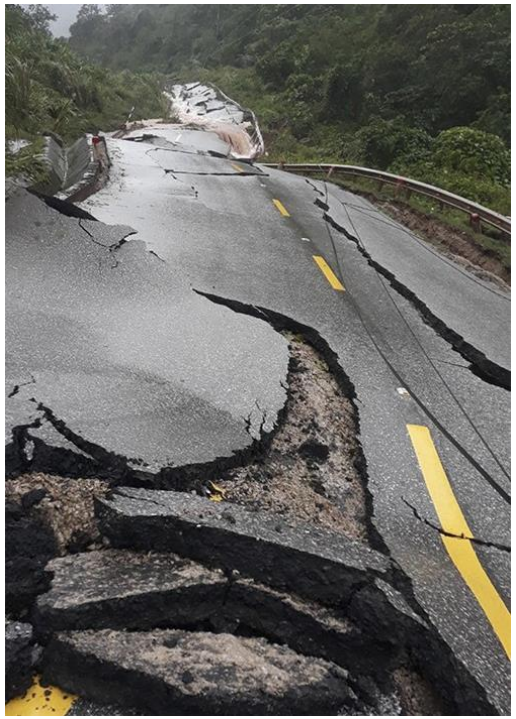
Step 1

- The level of detail will depend on whether this is a IBFWS for a specific sector or for the public.
- Ask delegates to write down any impact they can think of relating the hazard for which the table is being developed.
- *E.g., transport disruption, health impacts etc.,*

Determining Levels of Impact

Severity of Hazard

Very Low



Low / Minor

Medium / Significant

High / Severe

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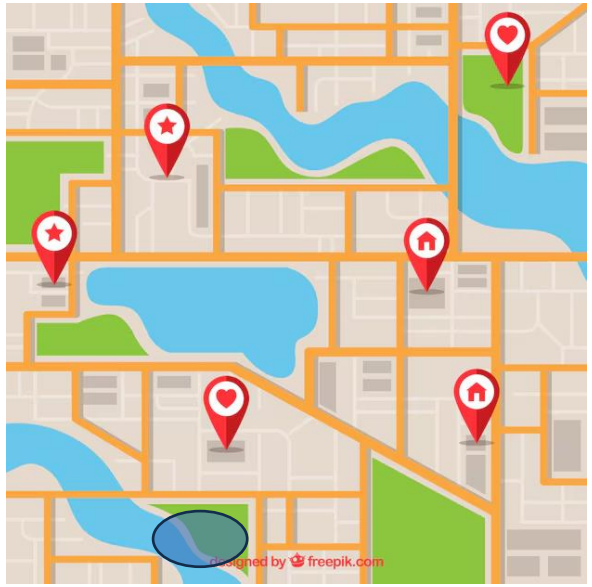
Step 2a

In groups, take the initial impacts documented and try and differentiate these across the 4 categories **considering severity…**

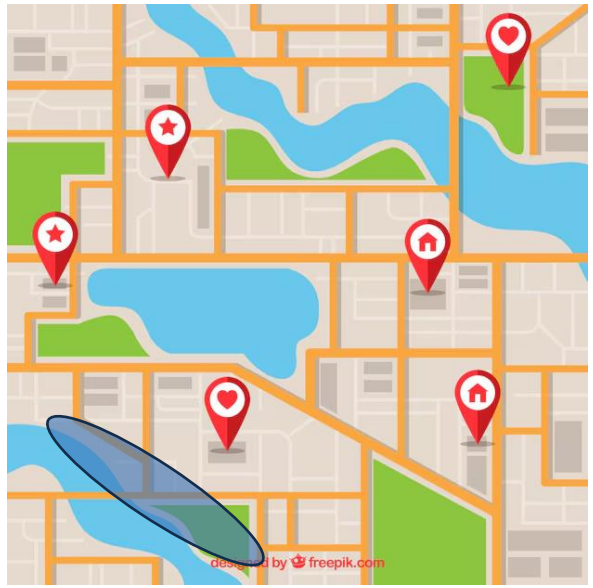
e.g. Health Impacts relating to high temperatures

Very Low	Low	Medium	High
Minor discomfort, increased sweating	Dehydration	Heat Stress	Heat Stroke

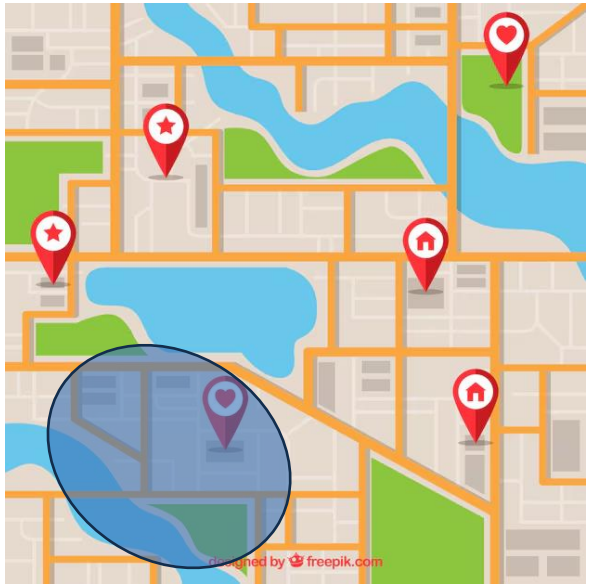
Extent/location of Hazard



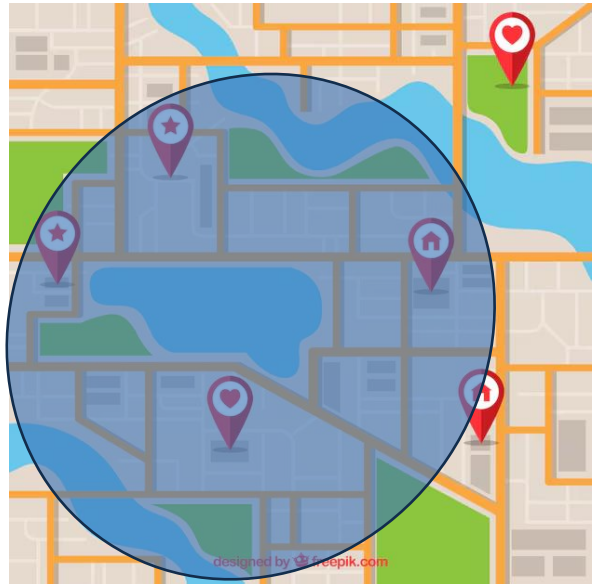
Very Low



Low / Minor



Medium / Significant



High / Severe

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Step 2b

In groups, take the initial impacts documented and try and differentiate these across the 4 categories **considering spatial extent/location…**

e.g. Agriculture impacts relating to high temperatures

Very Low	Low	Medium	High
Few/very localised impacts to crops from loss of water / soil moisture	Localised reduction in crop yield	Reduced yield in some places	Widespread reduction in crop yield

Duration of Hazard/Recovery Time

Impact Levels for All Weather Types			
Very Low	**Low**	**Medium**	**High**
On the whole, day to day activities not affected but	Some short lived disruption to day to day	Injuries with danger to life	Danger to life
‘NORMAL WEATHER’	‘BUSY DAY’	SHORT TERM STRAIN ON EMERGENCY SERVICES	PROLONGED STRAIN ON EMERGENCY SERVICES

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Step 2c

In groups, take the initial impacts documented and try and differentiate these across the 4 categories **considering duration/recovery time…**

e.g. Water availability relating to high temperatures

Very Low	Low	Medium	High
Short term interruptions to water supply (few hours)	Interruptions to water supply (up to a day)	Prolonged water shortages (a few days)	Long term water shortages (weeks)

Rainfall Impact Table

Example of impacts relating to the severity, extent, duration

Sector ↓ / Impact Level →	Minimal Impacts (Very Low)	Minor Impacts (Low)	Significant Impacts (Medium)	Severe Impacts (High)
Risk to life	No risk	Injury from fast flowing water or falling debris possible	Possible danger to life	Extensive search and rescue operations needed. Many regions/municipalities evacuations needed. Danger to life is expected from fast flowing deep water
Transport	Some traffic congestion. Small delays.	Airport: Delay-hours? Road: Traffic congestion, water on roads, driving conditions affected by water, slight delays. Water: Southwest region: delays (short term few hours)?	Airport: Long delays/some cancellations? Roads: Significant damage of several village roads (mud) Vehicles submerged under water	Prolonged closure airports/ports? Days? Weeks? Several international airports closed? Roads: Complete destruction of several village roads (mud)
Utilities	Power interruptions	Power loss, temporary. Hours?	Significant power loss across several areas/regions? Hospitals/school affected?	Destruction of power sources. Long power loss to important sectors (hospitals)days/weeks?
Agriculture/ Fishing	Slight damage to fishing boats	Slight damage to plantations during season. Slight to moderate damage to fishing boats	Large areas of damage to plantations during season. Severe damage to fishing vessels.	Widespread loss, complete destruction of whole harvests and plantations. Complete damage or loss of fishing and ship vessels?
Communications	Some areas may see temporary communication interruptions	Some areas may see temporary communication interruptions	Communication interruptions for large areas	Complete loss of Communications weeks?
Communities	Isolated slight flooding of low-lying areas, small damage.	Areas cut off temporarily, slight damage to houses and building structures	Areas cut off for several days. Partial damage to houses and building structures	Widespread: more than two local municipalities affected. Complete loss or widespread damage to houses and building structures across several areas.

Step 3

Look at the results from **Steps 2a, b & c** and try and consolidate the range of impacts by sectors **considering severity, extent and duration…**

Are there some impacts which when some combination of location, extent and severity are combined may lead to higher level impacts?

Impact Levels for All Weather Types			
Very Low	**Low**	**Medium**	**High**
On the whole, day to day activities not affected but	Some short lived disruption to day to day	Injuries with danger to life	Danger to life
'NORMAL WEATHER'	'BUSY DAY'	SHORT TERM STRAIN ON EMERGENCY SERVICES	PROLONGED STRAIN ON EMERGENCY SERVICES
affected.	under 'business as usual' response by	Transport routes and	

Minimal	Minor	Significant	Severe
Day to day activities not affected but some ***small scale*** impacts occur	Some ***local*** incidents, minor disruptions, 'business as usual' for emergency responders	Disruption to day to day routines and activities, mostly ***localised***. ***Short-term*** strain on emergency responder organisations	***Widespread,*** Prolonged disruption to day to day routines and activities ***Prolonged*** strain on emergency responders organisations.

Try and consolidate the impact table as best as you can. Collating impacts considering all three aspects as best as possible.

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Example

Rain National Severe Weather Warning (UK)

Escalation of extent of flooding from BaU (those in susceptible or flood prone locations) to highly disruptive (widespread flooding of homes and businesses) – all derived from “flooding” as the overarching impact

Escalation of impacts of spray and standing water on roads, again localised in the very low impact column, to dangerous levels in the high impact – but all essentially derived from the same initial impact “road conditions/driving conditions”

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Very Low	Low	Medium	High
A few places will have flooding of low-lying land and susceptible roads.	Some flooding of homes and businesses and susceptible roads	Flooding of homes and businesses.	Widespread flooding of homes and businesses.
A few transport routes affected.	Some transport routes and travel services affected. Some journeys require longer travel times.	Danger to life from fast flowing/deep water.	Danger to life from fast flowing/deep water.
Road conditions affected with spray and some standing water in a few places.	Road conditions affected by spray and standing water.	Damage to buildings/ structures.	Extensive damage to and/or collapse of buildings/ structures.
	Short term disruption to utilities and services in some places.	Transport routes and travel services affected. Longer journey times expected. Some road closures.	Transport routes and travel services disrupted for a prolonged period. Long travel delays.
		Difficult road conditions due to spray and standing water.	Widespread road closures.
		Interruption to utilities and services.	Dangerous driving conditions due to spray and standing water.
		Some communities temporarily inaccessible due to flooded access routes.	Prolonged disruption to or loss of utilities and services.
			Communities become cut off for a prolonged period, perhaps several days, due to flooded access routes.

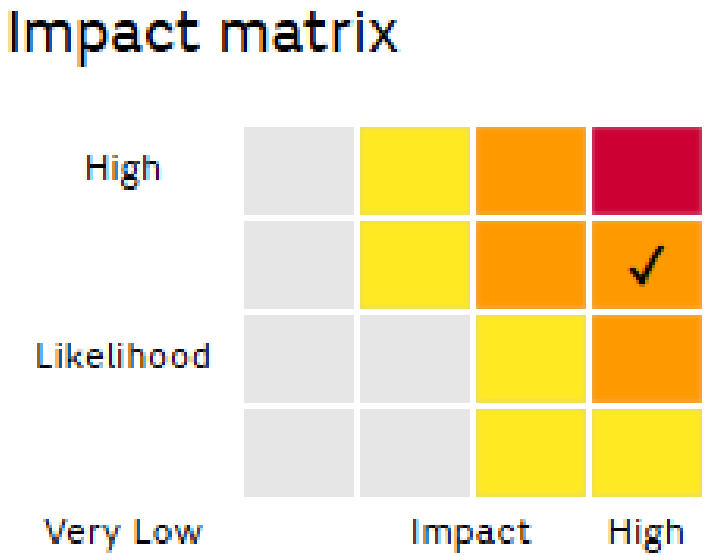
Example Impact Table – Rain (SAWS)

Minimal	Minor	Significant	Severe
Business as usual	Localised Business as usual	Localised Short term strain on emergency personnel	Widespread Prolonged strain on emergency personnel
• Some pooling of water on roads or in formal/informal settlements • Day to day activities not disturbed • Wet roads and reduced visibility • Minimal traffic congestion • Isolated mudslides and rockfalls	• Localised flooding of susceptible formal/informal settlements or roads, low-lying areas and bridges • Major roads affected but can be used, increased travel times • Difficult driving conditions on dirt roads • Minor motor vehicle accidents due to slippery roads and/ reduced visibility • Closure of roads crossing low water bridges • Localised and short term disruption to essential services (water, electricity, hospitals, schools etc)	• Flooding of roads and settlements (formal and informal) • Danger to life (fast flowing streams / deep water) • Displacement of affected communities • Some communities temporarily not accessible/cut-off • Damage to property, infrastructure, loss of livelihood and livestock • Major disruption of traffic flow due to major roads being flooded or closed	• Widespread flooding of roads and settlements • Danger to life (fast flowing streams / deep water) • Large communities not accessible/cut-off for a prolonged period • Widespread displacement of affected communities • Widespread damage to property, buildings and loss of livelihoods and livestock • Widespread transport routes and travel services severely affected

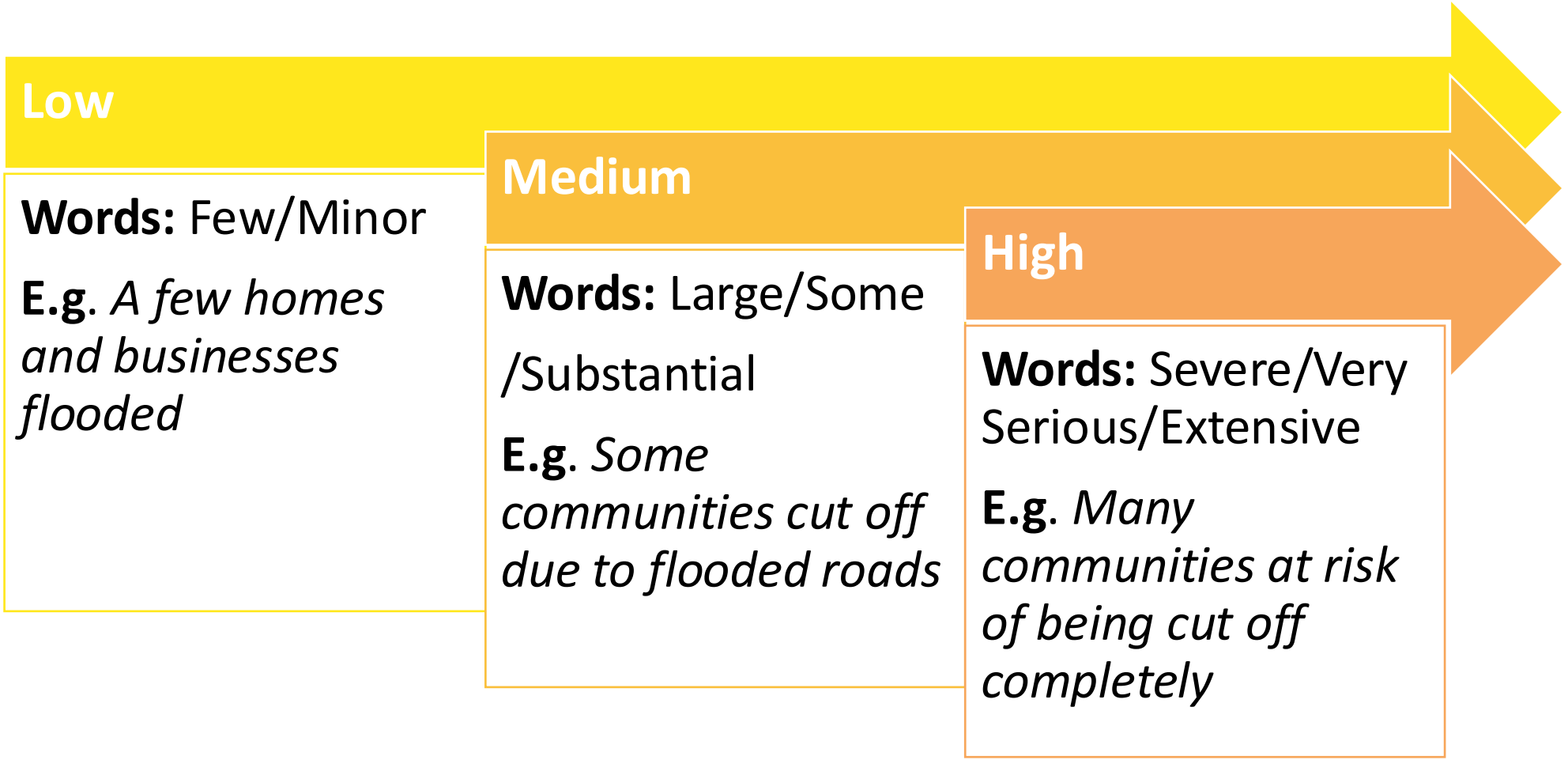
Impact Tables and Likelihood

Communicating Likelihood

- Up to now we've just been considering the level of impact.
- We need to also communicate the likelihood of the impacts occurring…



Communicating Impacts



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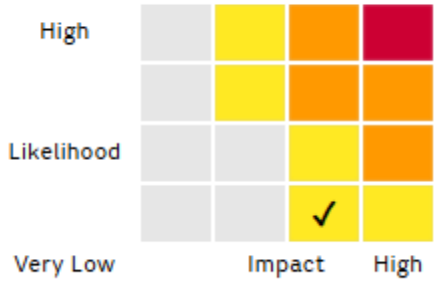
NSWWS Best Practice Guide (UK)

Matrix Likelihood Label	Best Practice Likelihood %	Word/Phrase
High	>80%	Definitely
High	>80%	Certain
High	>80%	Will happen
High	>80%	Almost Certain
High	>80%	Very Likely
High	>80%	Expected
Medium	50-80%	Anticipated
Medium	50-80%	Good chance
Medium	50-80%	Likely
Medium	50-80%	Probably (probable)
Low	30-50%	Possible[2]
Low	30-50%	Might
Low	30-50%	Potential
Low	30-50%	Maybe

Rainfall - NSWWS

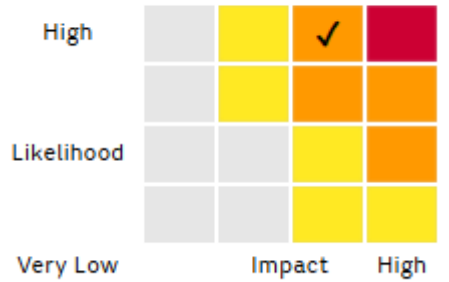
Impact matrix



What to expect

- There is a small chance that homes and businesses could be flooded, causing damage to some buildings
- There is a small chance of fast flowing or deep floodwater causing danger to life
- Where flooding occurs, there is a slight chance of delays or cancellations to train and bus services
- Spray and flooding could lead to difficult driving conditions and some road closures
- There is a small chance that some communities will become cut off by flooded roads
- There is a slight chance of power cuts and loss of other services to some homes and businesses

Impact matrix



What to expect

- Homes and businesses flooded and damage to some buildings
- Danger to life from fast flowing or deep floodwater
- Delays or cancellations to train and bus services
- Spray and flooding leading to difficult driving conditions and some road closures
- Some communities cut off by flooded roads
- Power cuts and loss of other services to some homes and businesses

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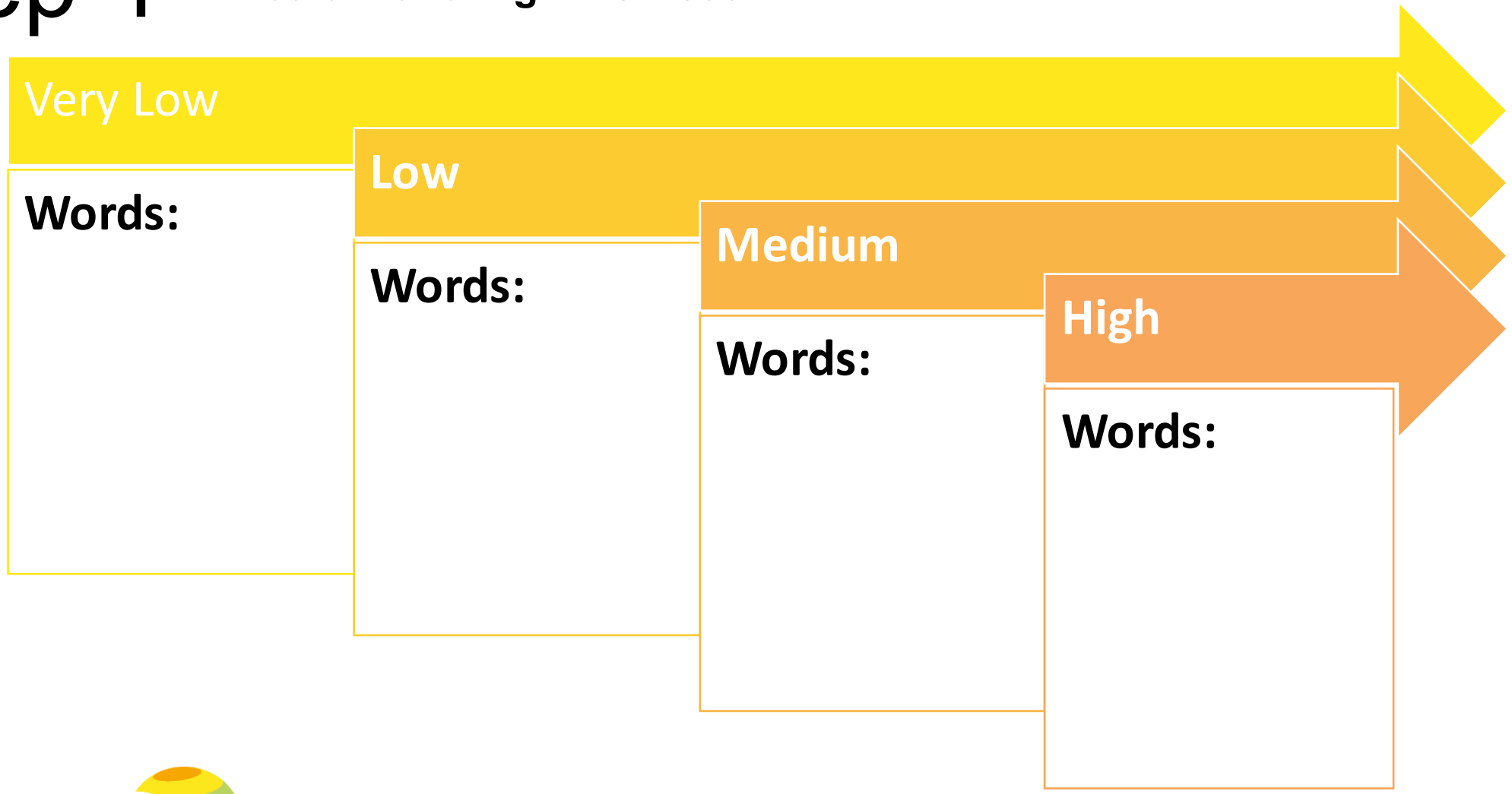
Step 4

What words do stakeholders understand to mean; **very low, low, medium and high** likelihood?



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Creation of Impact Tables Summary

- **Collection of Information**
  - Identify general impacts of the hazard identified
- **Differentiate across levels of impact considering**
  - Severity levels
  - Spatial extent
  - Temporal duration of hazards
- **Language**
  - Agree language for likelihood
- **Testing and Revising**
  - Test and sensitise with stakeholders, communities, partners, government officials… (consider table-top exercises based on past cases in your country)
  - Revise!

That’s not quite the end of it…

- How do we consider the thresholds / tipping points at which these impacts, at different levels might occur?
- What vulnerability and exposure considerations are there?
- How do these vary spatially or temporally?
- How do we document and understand these elements?
- **These are all vitally important questions in the creation of impact tables!**

Any questions?

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