Severe Weather Impact Prediction:
Sector Partner Engagement

Natural Hazards Research Forum

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Today

Overview
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Findings
Implications

Project Overview

Focused on impact from two hazards:

1. **Wind for large-scale systems**

2. **Severe thunderstorms** involving wind, hail and/or rain

Research Questions

1. How can **impact- and exposure-based forecasts** be designed to **inform decision making** for planning, preparedness and response? What decisions and outcomes will be improved?

2. What **different types of information** are required by **different user groups**?

"How do agencies want **forecast impact and the associated uncertainty to be communicated?**"

The Impact Triangle

Location-based asset information

Data Source: **Geoscience Australia**
Australian Exposure Information Platform (AEIP)

Asset vulnerability – Location and characteristics including structural, economic and demographic.

Data Source: **Geoscience Australia** databases
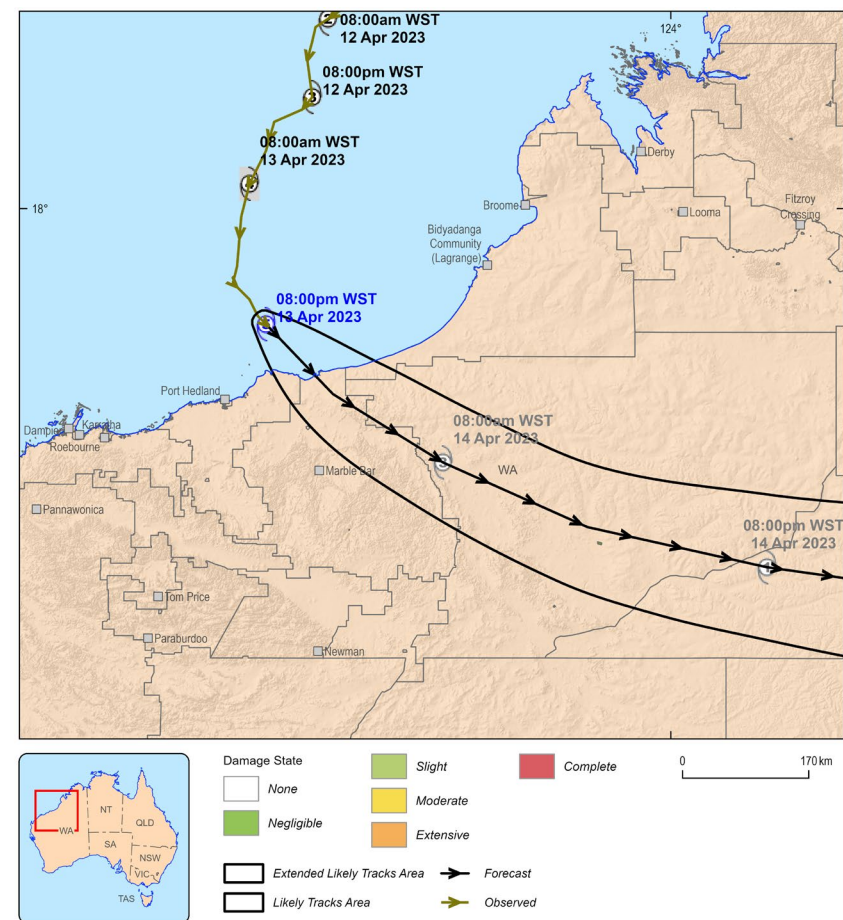
Large-scale winds Severe thunderstorm

Data source: **Bureau of Meteorology**

Current capability

Data Analysis

NEXIS
VAWS
HazImp
...

National Hazard Impact and Risk Service
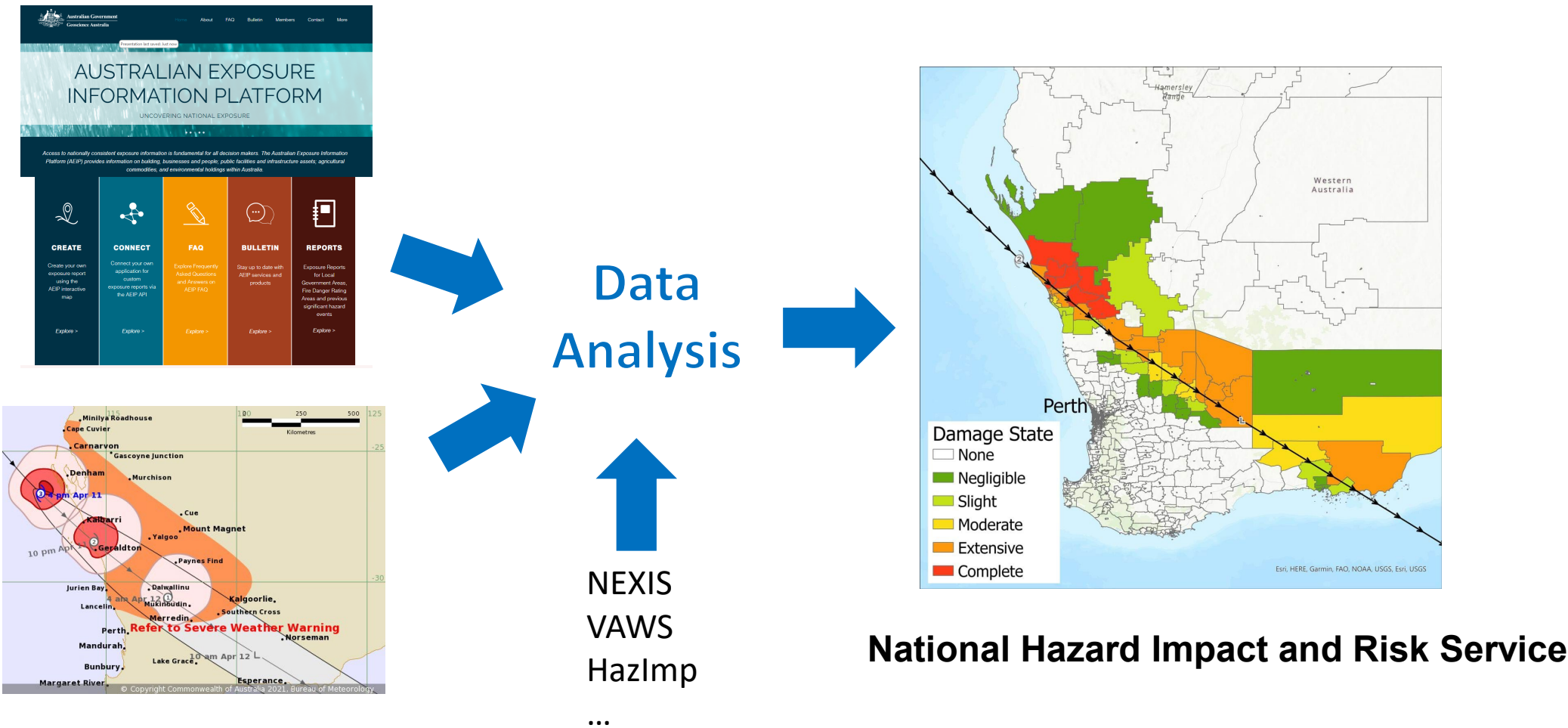
Example. Severe Tropical Cyclone Ilsa, April 2023

Forecast Impact – 4 hours ahead of landfall in NHIRS

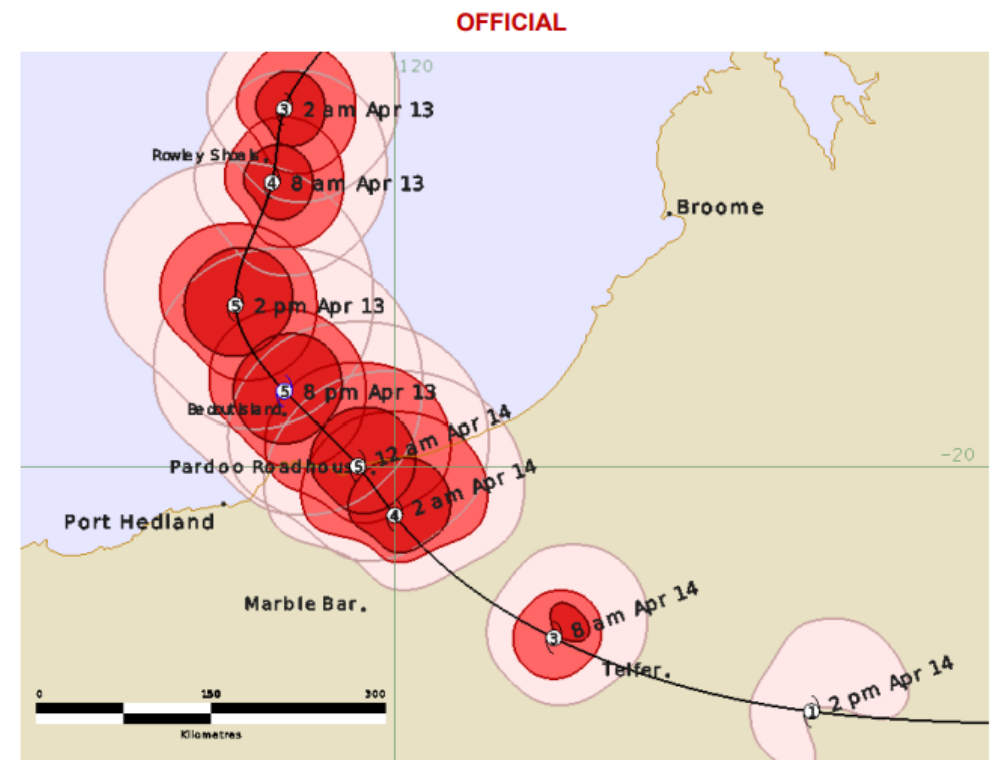**Post-event Cyclone Path**

Figure 2b. Detailed best track of Severe Tropical Cyclone Ilsa showing wind radii (gale - pink, storm - red and hurricane force – dark red) 13-14 April 2023 (times in AWST, UTC +8).

http://www.bom.gov.au/cyclone/history/pdf/Ilsa2023_report.pdf

Project Approach

AFAC Flood Severe Weather Intelligence Services Technical Group (FSWISTG) engaged as a reference group

May 2023

Raise profile through Natural Hazards Research Forum, social media and at AFAC Conference

Undertake baseline survey

16 Jun – 19 July 2023

166
respondents

Sector Partner workshops and targeted interviews with key users

17-23 August 2023

38
participants

Validate consultation outcomes with AFAC FSWISTG Reference Group

18 Oct 2023

Project Findings

3 key user types

10 use cases

8 priority information needs

Australian Government
Geoscience Australia

The Bureau of Meteorology

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Three Key Types of Decision-Makers

1. **Intelligence function** of an IMT during response

2. **Relief and recovery functions** in local, State and Commonwealth agencies.

3. **Essential services** and **critical infrastructure providers**

10 Decision-Making Scenarios

1. **Activating** emergency response teams

2. **Resourcing allocation and rostering** response teams

3. **Communicating** ongoing risks and impacts to government, stakeholders and the community

4. **Issuing information and warnings**

5. **Coordinating with other agencies**, essential services and critical infrastructure providers

6. **Identifying and establishing evacuation centres and routes**

7. **Planning and setting up relief centres**, providing accommodation and logistics co-ordination

8. **Assessing damage/length of disruption** to homes, critical infrastructure, community facilities and access routes

9. **Planning to support vulnerable cohorts**

10. **Planning for recovery**

Eight priority information needs

Meteorological and environmental		
	I	Antecedent conditions
	II	Relative intensity for a geographic location
	III	Range of meteorological event severity
	IV	Relevant historical meteorological events

All		
	V	Observations versus forecast

Exposure		
	VI	Location of specific cohorts, including vulnerable cohorts
	VII	Dynamic human considerations

Impact		
	VIII	Disruption to essential services and critical infrastructure

Three high level implications

Implication #1

Timely access to a range of appropriately presented information, spanning meteorological, exposure and impact forecasts, would support real-time decision making for EM sector partners.

Detail

H1.1 **Build EM sector awareness** of existing tools and capability

H1.2 **Share information with the EM sector.** This includes progress and outcomes of impact-based forecasting research activities.

H1.3 **Engage with other industry stakeholders**. This includes energy, water, food supply chain and insurance stakeholders.

Three high level implications

Implication #2

Extend scientific and technical capability in line with sector partner information needs.

Detail

H2.1 Engage with the **cross-section of sector partners and industry stakeholders** who have registered interest to contribute to the Bureau and GA's development roadmap.

H2.2 **Identify high-value prospects for implementation**

27 May 2024

Three high level implications

Implication #3

Consider a **phased approach to providing enhanced information** for decision-making, focusing initially on **exposure** forecasting, then followed by **impact** forecasting.

Detail

H3.1 Continue developing and engaging on exposure forecasting as a step change

H3.2 In partnership with sector partners, develop an agreed vocabulary and terminology

H3.3 Explore benefits and appetite for operationalising existing decision-making support systems such as NHIRS impact reports, including identifying any information access and security issues that may arise

H3.4 Develop the business case for the development of an enhanced exposure and impact forecasting system.

27 May 2024

Questions