



FOR A SAFER STATE

An introduction to Earthquake Gnowangerup Community

DFES Emergency Management Intelligence Branch



Today's session

Key outcomes

1. Improve your understanding of earthquakes
2. Explain what is happening around Gnowangerup, and what you should plan for
3. Understand how to be safe before, during and after an earthquake

Meckering Earthquake

14 October 1968. **Magnitude 6.5**



Photo left: State Library of Western Australia; photo centre: West Australian Newspapers Limited; photo right: Johnston & White, 1968.



Photos: West Australian Newspapers Limited (left), Johnson & White 1968 (right)



Other Historic WA Earthquakes



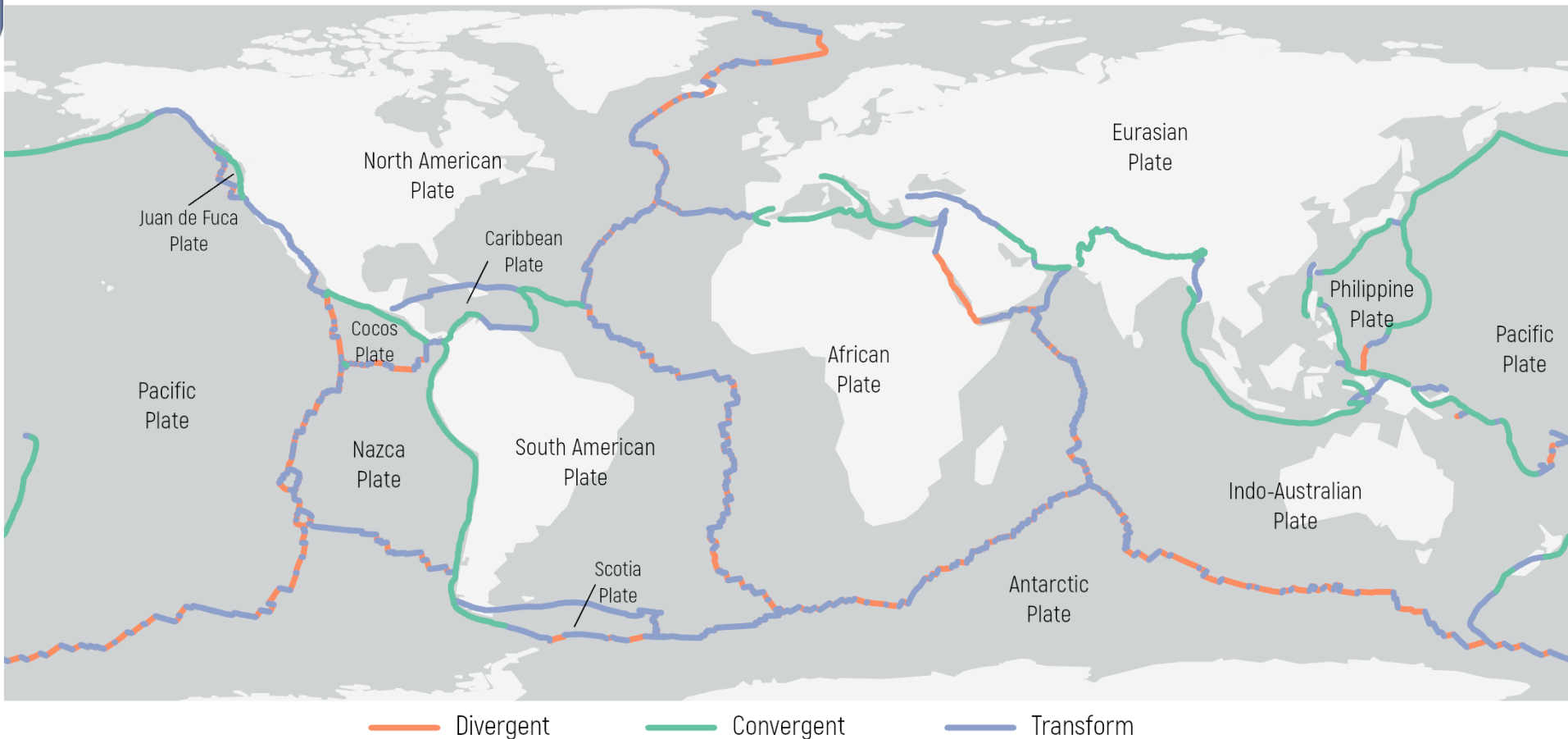
Cadoux – 1979. Magnitude 6.1

House damaged during the Cadoux earthquake in 1979. Photo source: WEST AUSTRALIAN NEWSPAPERS LIMITED

“There was not one property within a 12km radius that was left undamaged”
– Women’s Weekly 1979

Western Australia has
experienced
approximately 4000 earthquakes
in the last decade

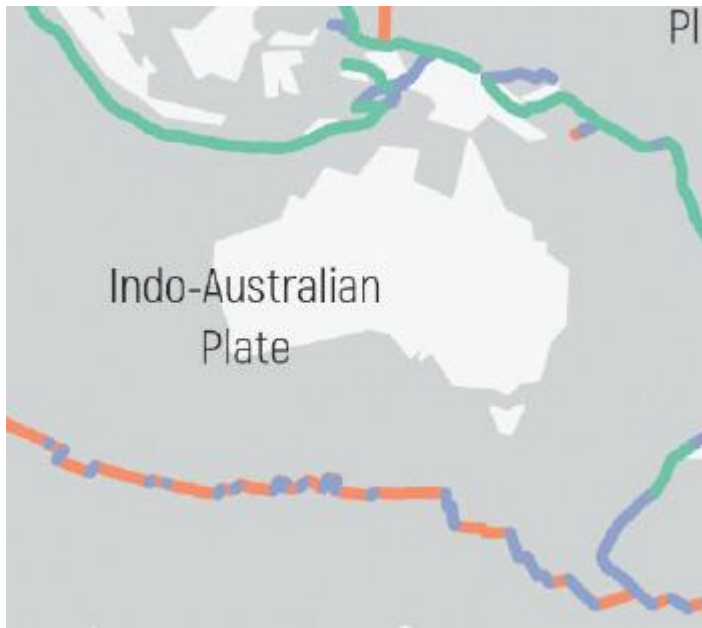
Earthquakes – as you probably know them



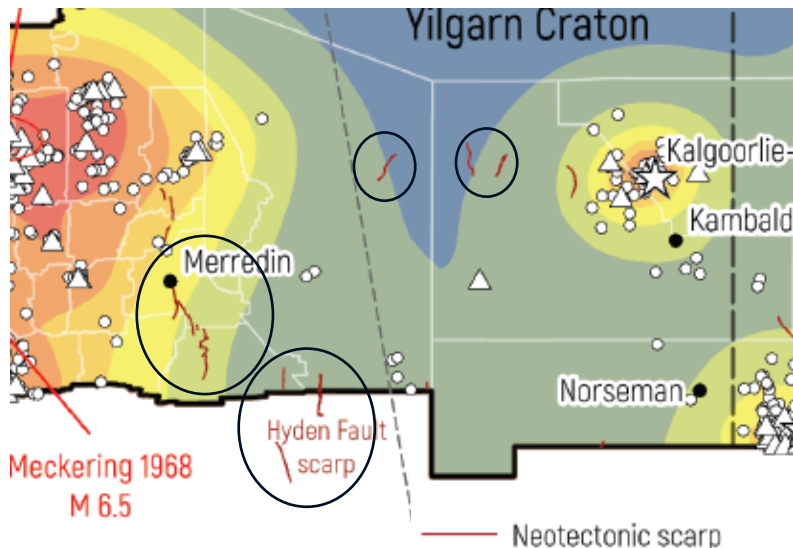
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www.usgs.gov/programs/earthquake-hazards/google-earthtml-kml-files



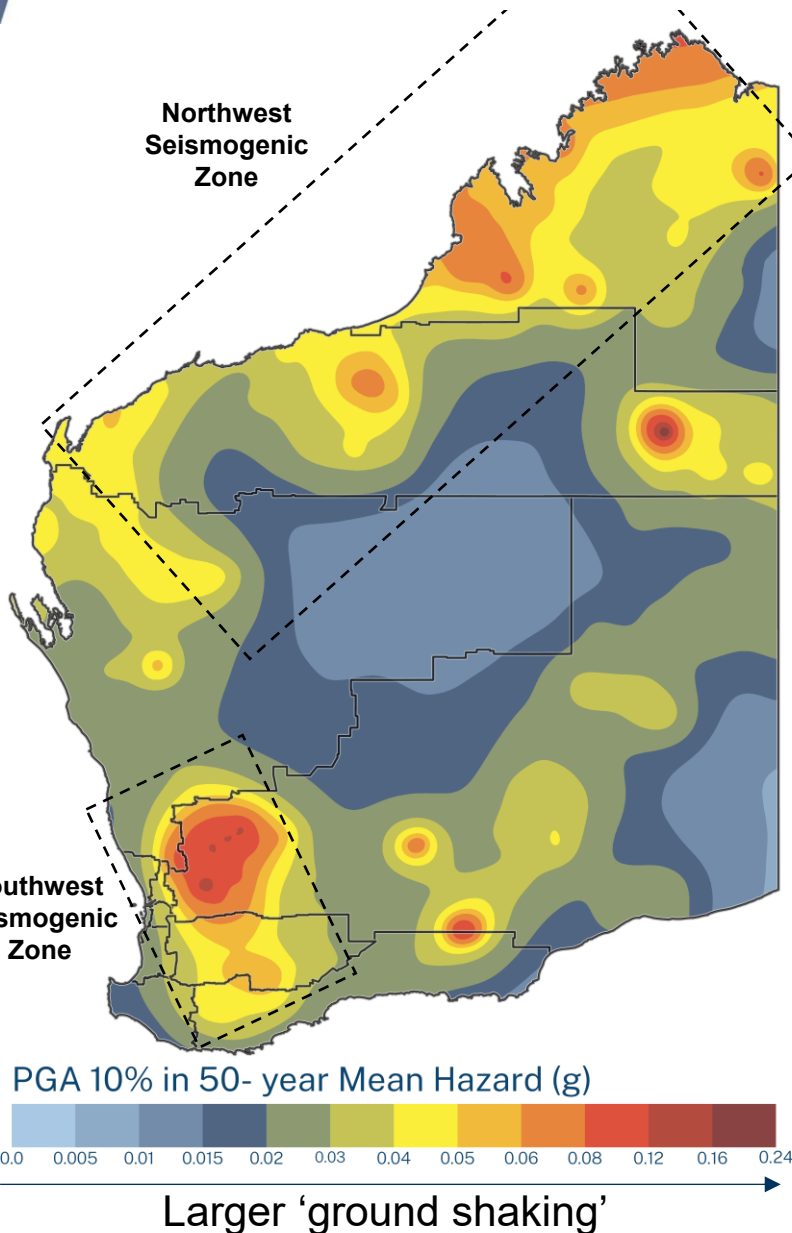
Earthquakes in Australia



- Australia experiences intraplate earthquakes
- >100 events of magnitude 3.0 or more recorded each year
- Potentially damaging magnitude 5.0 occur once per year. Magnitude 6.0+ expected every 10 years
- Why do they happen? **Not fully understood.**
- Often associated with preexisting weaknesses in plate ('rifts' or 'fractures'), or transferring stress from plate boundaries



Does WA get Earthquakes?



- **Most active state, both in size & number of earthquakes**
- Experience over half of Australia's earthquakes (about 1 per day)
- The South West has the highest seismic potential in WA
- So far in 2026 (as at 5 March)
 - 145 earthquakes
 - 10 exceeding magnitude 3, largest was M3.8 (on Monday night near you)
 - Around Gnowangerup - **More than 100 since February**

Earthquakes in WA

- Unpredictable occurrence & don't follow easily identifiable patterns
- Shallow events common (<5-10km)
- Prone to earthquake swarms
- They can be 'large', and impactful. Earthquakes in WA could reach magnitude 7.6. Large events are very rare.
- **Most of them are small.**

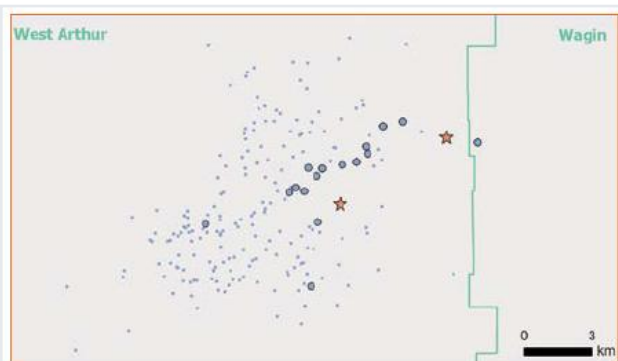


Figure 10: Distribution of earthquakes of the Arthur River Swarm recorded in 2022.

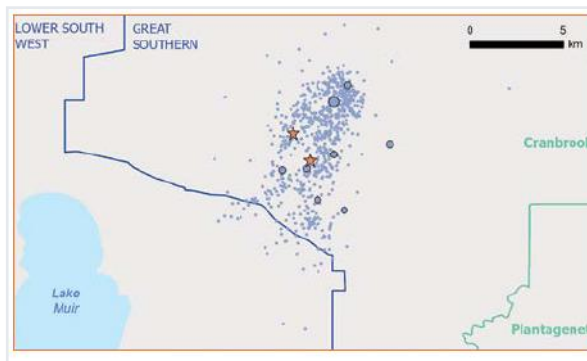
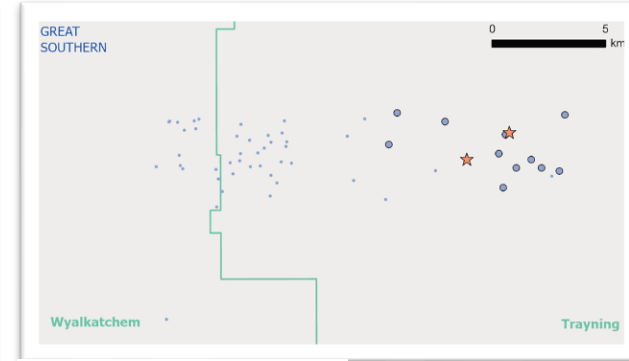


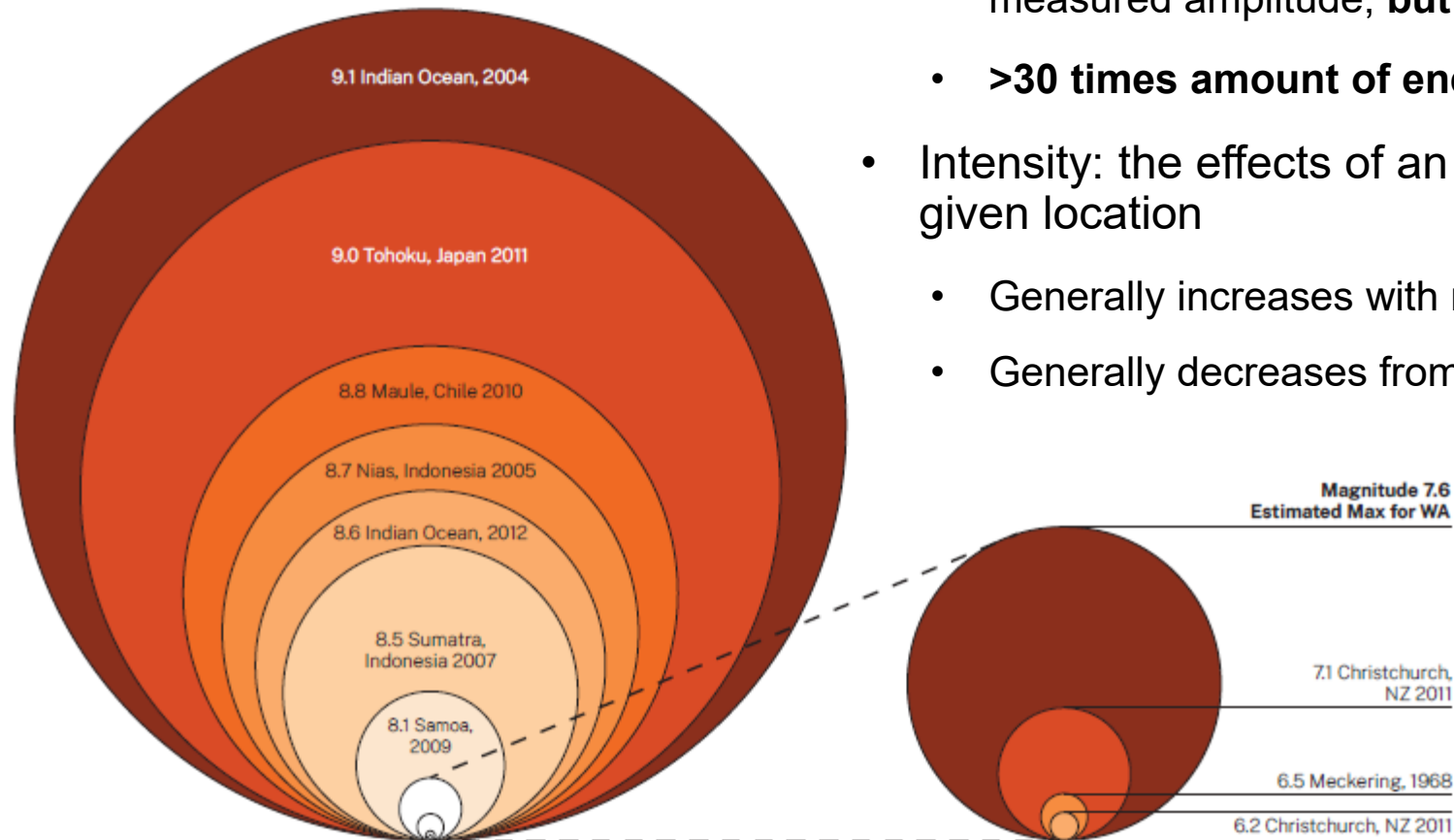
Figure 12: Earthquakes recorded during 2018, showing the cluster of events of the Lake Muir Swarm.



Wyalkatchem/Traying August 2024

Size and Energy Release

- Range from barely noticeable tremors to violent shocks
- Magnitude: the 'size' of the earthquake
 - increase magnitude by 1 = 10x increase measured amplitude, **but**
 - **>30 times amount of energy released**
- Intensity: the effects of an earthquake in a given location
 - Generally increases with magnitude
 - Generally decreases from source



Earthquake impacts

Primary and Secondary Impacts



- › Structural collapse due to non-earthquake-resistant construction or poor maintenance.
- › Damage or collapse of verandahs, parapets, chimneys, and roofs.
- › Fires caused by ruptured gas lines or fallen power lines.
- › Damage to communication and essential services infrastructure and road networks.
- › Damage to critical infrastructure such as power, water and sewage networks.



- › Coastal impacts due to earthquake-generated tsunamis.
- › Landslides and rockfalls on hill-slopes and road cuttings.
- › Structural collapse due to construction in vulnerable areas such as alluvial soils, reclaimed land, and water saturated sands and silts.



- › Injuries and loss of life.
- › Displacement from home due to damage to property and basic services.
- › Isolation of communities due to damage to critical infrastructure.
- › Loss of employment and income due to community disruption and building damage.
- › Long-term mental health impacts and trauma.

Earthquakes are different to other hazards

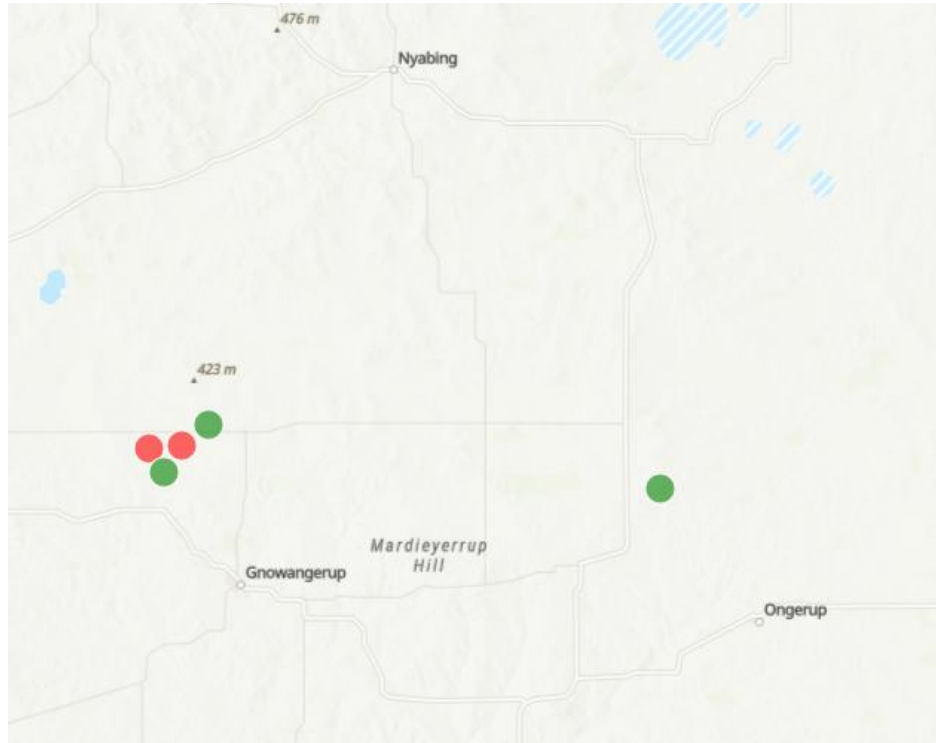
Compared to hazards you are more familiar with (e.g., fire, floods, thunderstorms), earthquakes are unique.

- No reliable warning
- No 'season'
- No forecast
- Threat can last for months

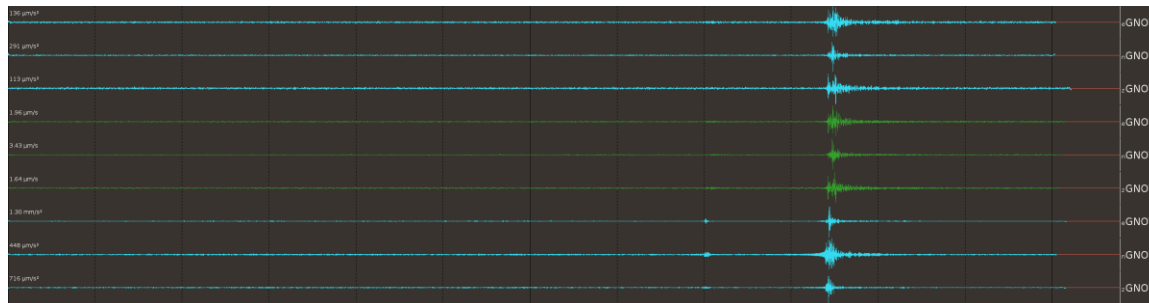
Because of this, we must prepare ourselves and the places we live, and understand how to stay safe during an earthquake

Recent earthquakes around Gnowangerup

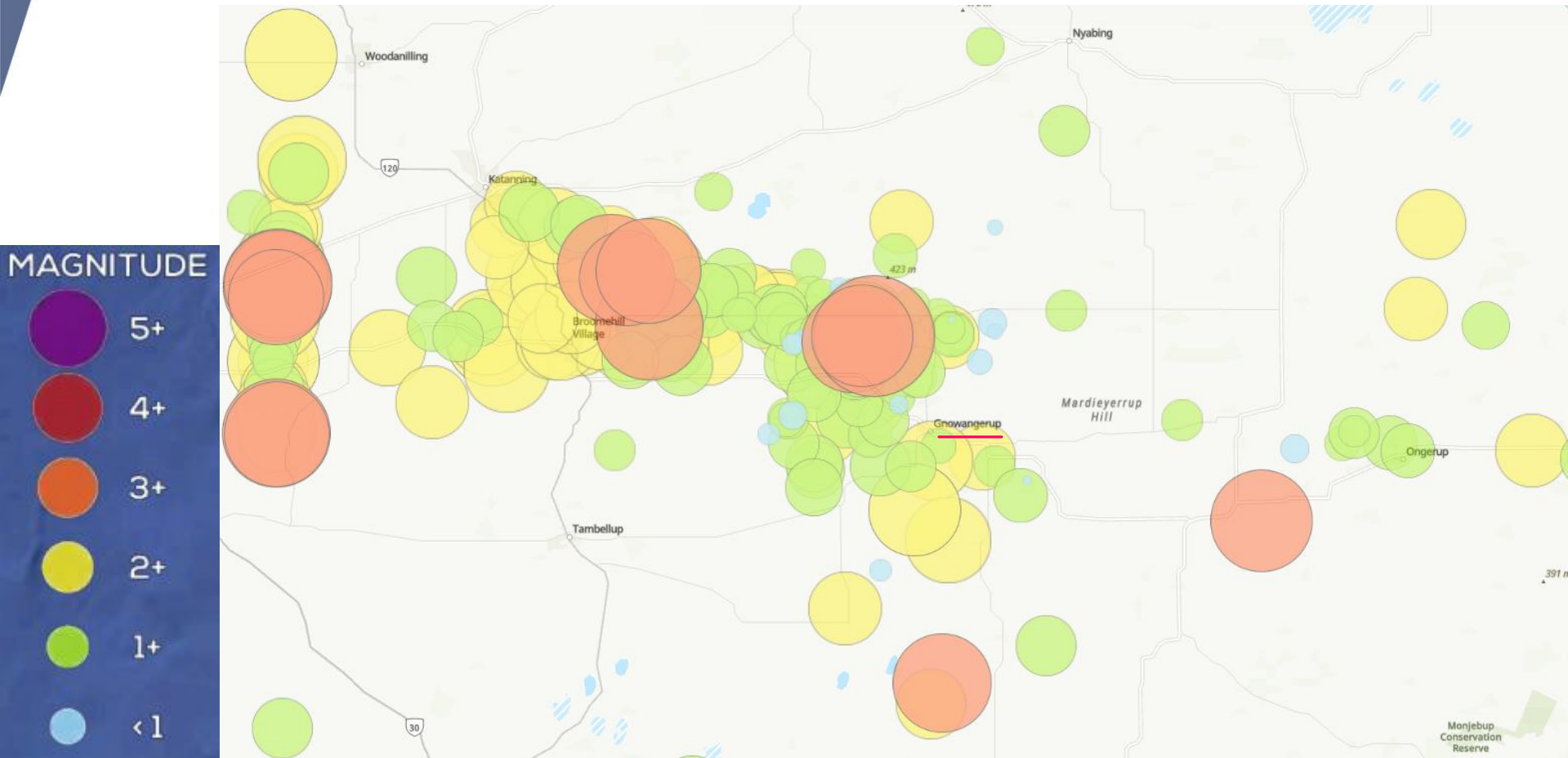
We are closely monitoring the situation



- 5 additional portable seismometers now in the area
- Monitoring all earthquakes, even those you can't feel
- Improving local understanding of earthquake sources and risk



Recent Earthquakes near you



- Earthquakes near Gnowangerup in the last month
- More than will be reported by Geoscience Australia

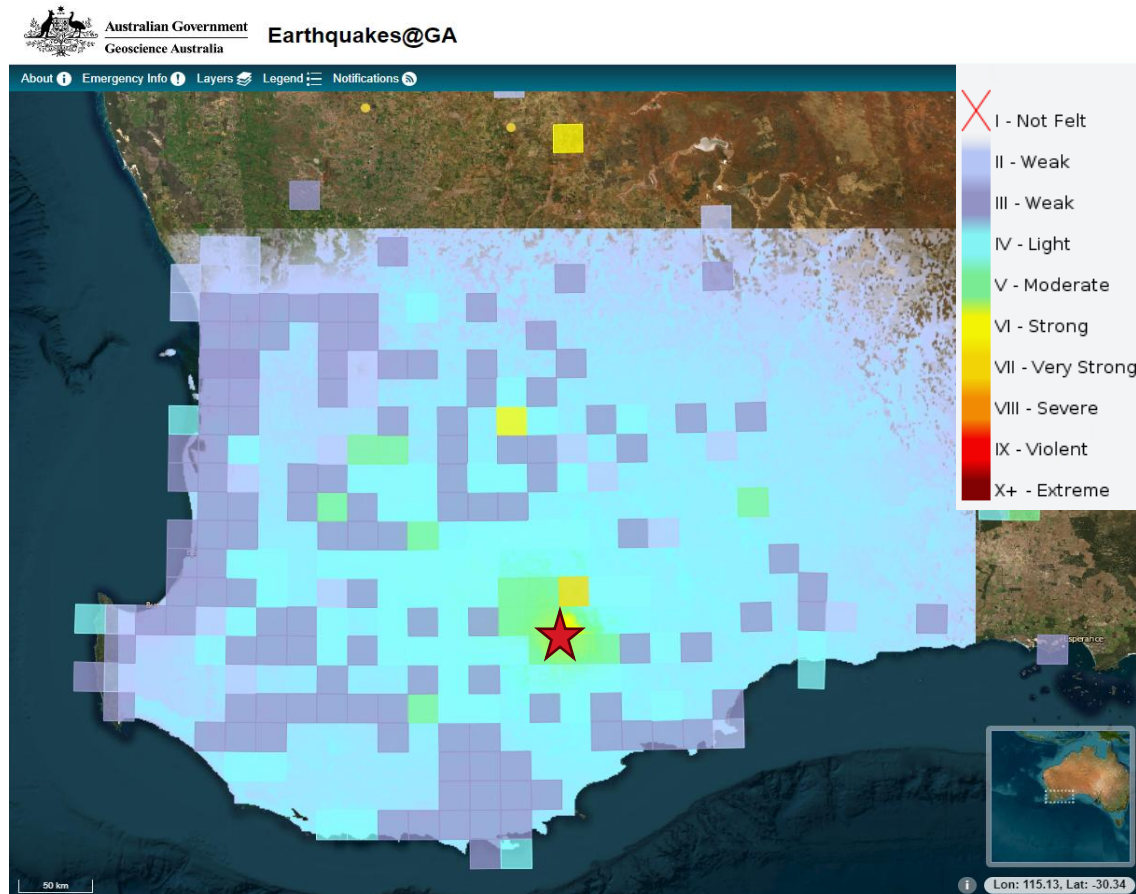
Much to be learned about earthquakes around Gnowangerup

- Scientists don't fully understand earthquake risk and hazard across the Great Southern, including around Gnowangerup
- Our monitoring now, sets us up to better understand earthquake risk in the future.
- It is normal to feel scared or anxious about what has been happening.

What have we learned from recent earthquakes?

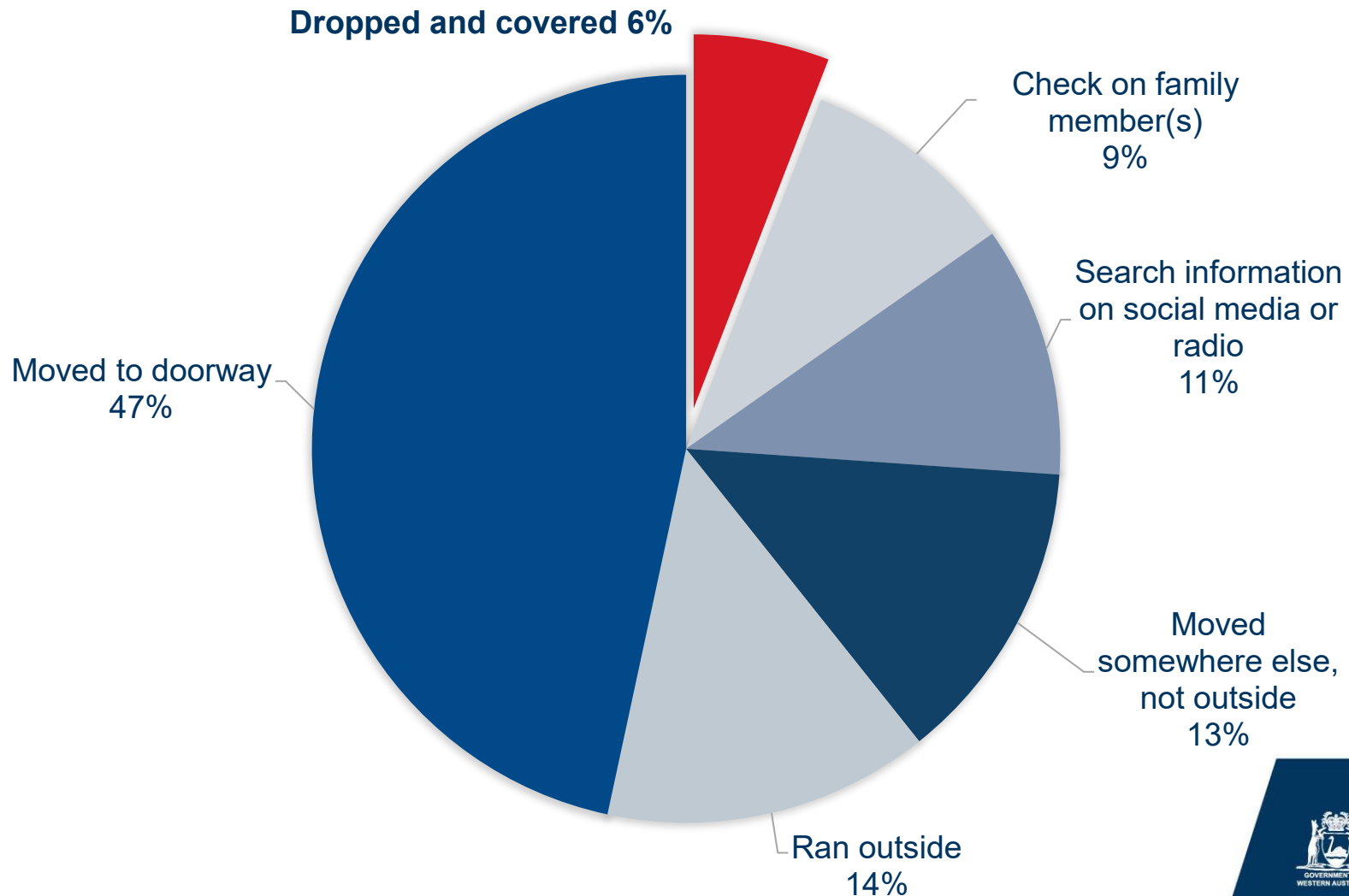
2023 Gnowangerup Earthquake

- Sunday 6 August at 5:34 am, 30 km NE of Gnowangerup
- Magnitude (Mw) 5.0
- 3518 people reported feeling the earthquake



2023 Gnowangerup Earthquake

What did people do?



Some buildings are more vulnerable

- Unreinforced concrete and brick, especially built before 1990
 - E.g. old historic buildings
- Brick chimneys
- Parapets on garages, older buildings



There have been a lot of earthquakes lately. What will happen next?

More earthquakes?

- **There is no certainty to what happens next**
- The area has experienced swarms/sequences and moderate intensity earthquakes in the past
- Aftershock sequences can continue for months to years; **impossible to predict their length**
- Most swarms in WA don't result in a larger magnitude event, but they are possible
- You should prepare for more earthquakes, and potentially a stronger shaking event

Damage?

- **Very few earthquakes result in substantial damage**
- Most earthquake damage is minor cracking (e.g. around door frames, along brick-work, plaster, around chimneys) and falling things (e.g. roof tiles, chimneys, shelves, furniture)
 - This can occur from several, smaller events
- Damage can occur at relatively low magnitudes (e.g. less than 5.0) when close to the earthquake epicentre
- Damage is relatively common for Australian earthquakes greater than 5.0, but this damage is usually relatively minor
- Some structures are particularly vulnerable (e.g. unreinforced masonry, unsupported awnings, chimneys)



2023 Gnowangerup – ~ Mw 5.0



2010 Kalgoorlie – Mw 5.0



2007 Katanning – Mw 4.7



What can I do to prepare for earthquakes?

Recommended actions

Preparation is key

- 1) Practice Drop, Cover, Hold On
- 2) Prepare your space (e.g., classrooms, your house, bedroom)
 - a) Reduce risks inside and outside the house
- 3) Develop your emergency plan and have an emergency kit
- 4) Know where to look for advice

Our Community Preparedness Guide is useful to assist this:

<https://publications.dfes.wa.gov.au/publications/dfes-earthquake-guide>

“Don’t be scared, be prepared”

What would you do during an Earthquake?

International advice: Drop, Cover, Hold On during an earthquake

If you feel shaking:

- 1**  **DROP!** DROP to the ground
- 2**  **COVER!** COVER your head and neck with your arms and shelter under a sturdy desk or table. If there isn't safe shelter nearby, crouch alongside a bench or an inside wall.
- 3**  **HOLD ON!** HOLD ON to your shelter and be prepared to move with it until the shaking stops

Using a cane



Using a walker



Using a wheelchair



Great ShakeOut – 16 October 2026

Earthquake Preparedness Guide



Western Australia

Earthquake Preparedness Guide

How ready is your family and property?



- Designed to improve understanding of earthquakes in WA
- Practical advices on how to manage risks posed by earthquake
 - **Before:** reducing impacts through preparing yourself, your family and your house.
 - **During:** drop, cover, hold on!
 - **After:** emergency support, wellbeing and recovery



Emergency Plans and Kits

Make a plan

Earthquakes occur without warning and can affect people at home, office, school, or outdoors. The following list presents the basics for developing an earthquake plan, but should be modified according to your circumstances.

- 1** Learn and practice **Drop, Cover, and Hold On**. If a member of your household has a disability or has special needs, practice "Drop, Cover, and Hold On" modified for each person.

Done!

How to Drop, Cover and Hold On
- Page 26

- 2** Identify safe spots at home and other frequented buildings, schools, offices, etc, such as sturdy tables or desks.

Safe spot at:

Home:

School:

Office:

- 3** Designate a meeting point for your household in case the home is damaged. For example the letterbox if safe.

Meeting point:

- 4** Record and update important emergency numbers and addresses.

Emergency contact:

Name:

Phone:

Address:

Jump to Checklists
- Page 41

Prepare and maintain an emergency kit

Emergency supplies will help a family during an earthquake if utilities and basic services are cut or if their home becomes severely damaged. The following emergency kit is designed for three days to one week and must consider all family members and pets. According to capability and budget, supplies can be gathered over time.



- Water: five litres of water per day per person for at least three days to one week. Consider storing water purification tablets.

- Food: store non-perishable food, such as dehydrated or canned foods. Include a manual can opener for canned items. Include food for those with dietary needs.



- First aid kit: find a list with the essentials at healthdirect.gov.au/first-aid-kits.

- Medical Supplies: prescription and over-the-counter medications required by anyone in the household. Keep a copy of prescriptions in case of evacuation.



- Torches and portable AM/FM radio, with spare batteries.

- Charged power bank or solar battery chargers for mobile devices.

- A whistle, combination pocket knife, gloves, small hand saw, small crowbar and rope.



- Matches in a waterproof container.

- Extra set of car keys.

- Cash.

- Blankets, and clothing according to your regional climate.

- Copies of documents, such as driver licenses, passports, immunisation records, and insurance policies.

- Several rolls of toilet paper, bar soap in a plastic container, plastic bags (large and small), and hand sanitiser.



- Consider your pets. What do they need? Food, water, bowls, bedding, medication or special requirements, registration/microchip information, lead.



- Store emergency kit in a central, dry, and easily accessible area. Stored at _____

- Replace stored food and water every six months. Date _____



Reduce risks around the house

Check your chimney and roof and repair loose tiles and bricks.

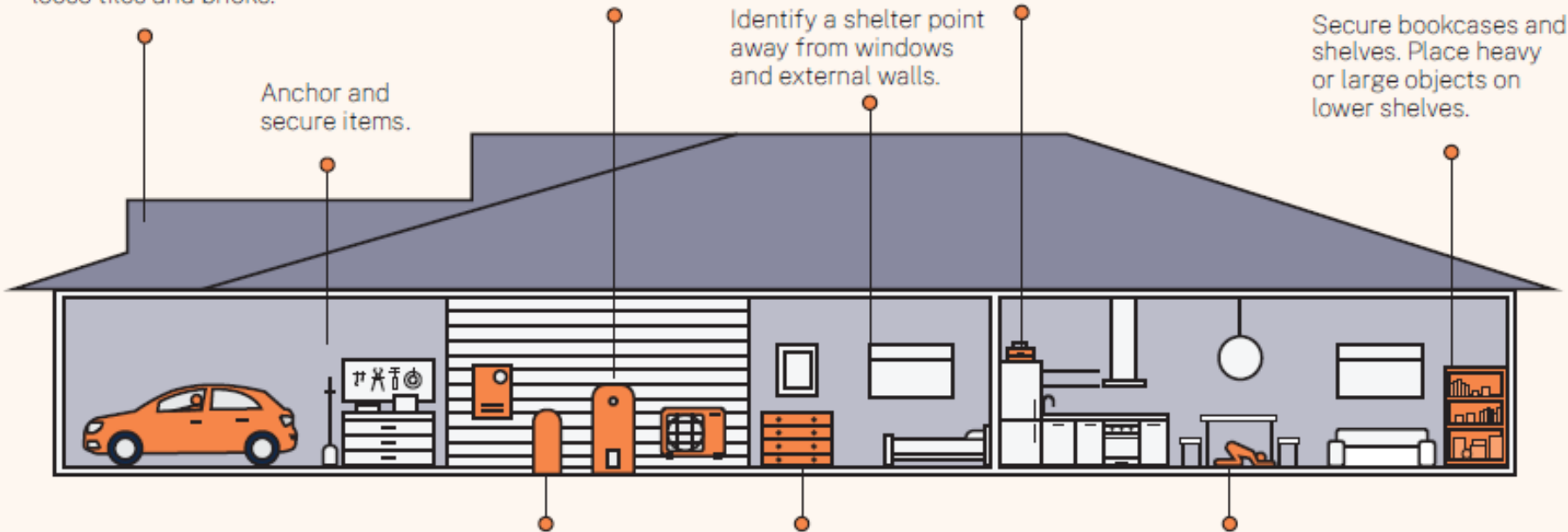
Secure water heater with a wide metal strap around the top attached to wall studs.

Include important documents in your emergency kit.

Anchor and secure items.

Identify a shelter point away from windows and external walls.

Secure bookcases and shelves. Place heavy or large objects on lower shelves.

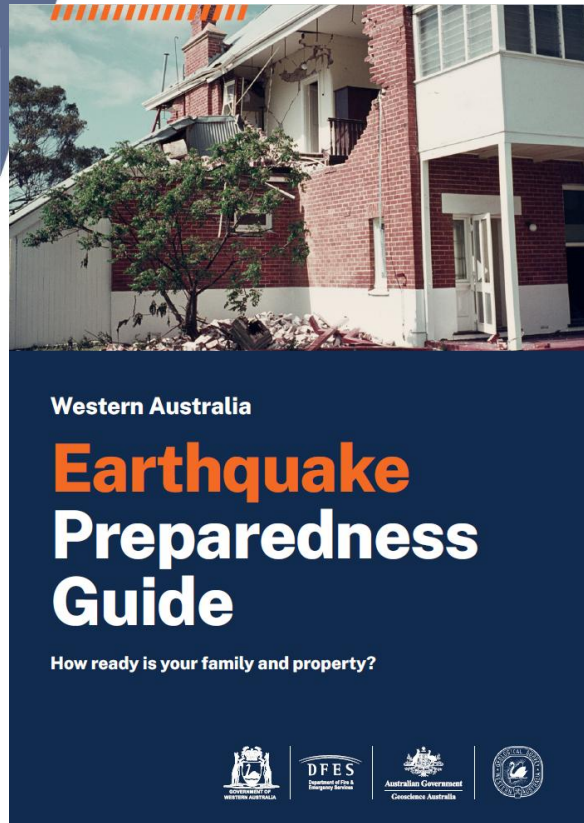


Know how to turn off your water, gas, electricity, and airconditioning.

Anchor items into the wall studs.

DROP to your hands and knees, COVER your head and neck, and HOLD ON to your shelter until shaking stops.

More Information



DFES *Community Earthquake Preparedness Guide*
<https://publications.dfes.wa.gov.au/publications/dfes-earthquake-guide>

Before and after Earthquake fact sheet
<https://publications.dfes.wa.gov.au/publications/before-and-after-an-earthquake-fact-sheet>

What to do during an earthquake fact sheet
<https://publications.dfes.wa.gov.au/publications/what-to-do-in-an-earthquake-fact-sheet>

Earthquakes@GA
<https://earthquakes.ga.gov.au/>

Geoscience Australia - Earthquake Hazard
<https://www.community-safety.ga.gov.au/hazards/earthquake>

The Great ShakeOut – International Earthquake Exercise.
Practice earthquake safety now, and participate on 16 October. <https://www.shakeout.org/>



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Thank you!

Questions?

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