# Severe Tropical Cyclone Seroja

April-May 2021

## Department of Fire and Emergency Services Community Report


dfes.wa.gov.au

GOVERNMENT OF WESTERN AUSTRALIA

DFES Department of Fire & Emergency Services

FOR A SAFER STATE


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# Acknowledgements

This report acknowledges the enthusiastic participation in the review process by members of the following:

- State Emergency Service.
- Volunteer Fire and Emergency Services.
- Volunteer Marine Rescue.
- Volunteer Fire and Rescue Service.
- Bush Fire Brigades.
- Department of Fire and Emergency Services (DFES) leadership personnel who were involved with managing the response.
- State Emergency Service Volunteers Association.
- DFES, including stakeholders in Media and Public Information, Operational Information Systems Teams, and various data custodians.
- External stakeholders including the WA Local Government Association, members of the All-Hazard Liaison Group, Bureau of Meteorology (BoM), the Australian Defence Force Joint Operations Support Staff, and the Australasian Fire and Emergency Service Authorities Council (AFAC).

# Purpose

This Community Report provides an overview of the initial response and transition to recovery efforts for Severe Tropical Cyclone Seroja, during 8 April to 1 May 2021.

The purpose of the report is to inform the Western Australian community, be they members of the public, private companies, or government bodies at various levels, as to the lessons identified for use to improve or sustain the DFES operational response.

The lessons identified in this report will considered by DFES and shared with our emergency management partners.

# Approvals

This report emphasises the FES Commissioner's commitment to continuous improvement in addition to addressing obligations under Western Australian Emergency Management arrangements.

Approval to conduct the After Action Review (AAR) and Community Report for Tropical Cyclone Seroja was granted by Deputy Commissioner Operations, with Assistant Commissioner Country Operations responsible for the conduct of the review.

# Commissioner's Foreword


Fire and Emergency Services Commissioner Darren Klemm AFSM

Severe Tropical Cyclone Seroja caused significant damage across Western Australia's Midwest Gascoyne and Wheatbelt regions and resulted in one of the largest recovery operations Western Australia has experienced in recent times. Although there has been significant progress, individuals, communities and local businesses are still rebuilding and continue with their recovery journey.

The efforts undertaken by local governments, volunteer and career personnel from both Western Australia and interstate, were nothing short of inspiring. Many of these people provided feedback to the DFES to assist us with undertaking this After Action Review.

I regard the After Action Review process as fundamental to the development of an efficient and effective response to incidents, alongside the overall preparedness of the State. This provides an opportunity for DFES and its partner agencies to continue to learn from these events and continue to work towards making Western Australia a safer state.

Fire and Emergency Services Commissioner Darren Klemm AFSM

# Executive Summary

# Executive Summary

Severe Tropical Cyclone (STC) Seroja was the largest natural disaster in recent history, in Western Australia (WA), with the Insurance Council of Australia identifying over A$351 million in claims incurred[1] to date.

Over 40 towns and communities were directly affected by the cyclone. STC Seroja crossed the coast near Kalbarri as a Category 3 cyclone and continued south-east across WA, finally devolving to a tropical low near Merredin, having covered approximately 600 kilometres in ten hours. Requests for assistance from impacted communities were identified from Kalbarri through to Northam. Travelling by road between these two points takes approximately six and a half hours.

STC Seroja and the related incident response and transition to recovery was significant due to the scale of the event and its location. Factors observed during this event:

- STC Seroja moved into parts of WA rated as non-cyclonic wind regions, meaning the infrastructure in the impact area was not built to withstand cyclones. This created more damage and therefore created more recovery work.
- The cyclone track was difficult to predict until shortly before impact due to the Fujiwhara effect (see page 13 for more detail).
- The impact area covered an estimated 133,000km$^2$ in a regional area. Significantly affecting post-impact actions; limited road networks; other essential services available in the region were significantly reduced. This also included a section of the major northern highway that had been damaged during flooding in the months prior to STC Seroja.

During the response and transition to recovery, between 8 April and 1 May 2021, 3,120 shifts[2] were resourced by first responders and support personnel across the Department of Fire and Emergency Services (DFES) uniformed and non-uniformed staff, volunteers, local government (LG), other state and interstate government agencies, and the Australian Defence Force (ADF).

Given the scale of response, the complexities of the environment in which the response occurred, and the number of different organisations involved, there was an opportunity to ensure lessons could be drawn from the experiences of personnel involved.

[1] Catastrophe 213: Cyclone Seroja - Insurance Council of Australia
https://insurancecouncil.com.au/news-hub/current-catastrophes/catastrophe-213-cyclone-seroja/

[2] Defined as the active period for a particular resource on a certain day. Shifts could be either day shift or night shift, and were generally standardised according to role and operational requirements.

The following lessons were identified throughout the process:

**Lesson 1:** *Emergency Management planning needs to consider the social environment, including transient populations, with an understanding of community risk awareness, to ensure critical communications are clearly understood, and followed.*

EM plans were exercised in accordance with the traditional risk profile of the region. While cyclone may have been mentioned in plans, the risk was not understood.

**Lesson 2:** *Incident-specific financial processes and suitable personnel, are required to ensure appropriate financial administration during an incident.*

The volume of expenditure and acquittals overwhelmed incident management teams due to a lack of financial management processes and dedicated personnel.

**Lesson 3:** *Critical sources of data to support decision making must be understood prior to them being relied upon as a source of truth.*

The Rapid Damage Assessment (RDA) and Request for Assistance (RFA) processes, while dealing with similar information, are designed for different purposes and do not naturally interact.

**Lesson 4:** *There is opportunity to reinforce DFES public information mechanisms as the single source of truth for public information.*

Public information once shared by external stakeholders may not be current.

**Lesson 5:** *Develop an improved natural hazard IMT capability, including appropriately skilled personnel through targeted training.*

The inability to locate suitably trained personnel meant that a percentage of personnel were deployed to the incident or operations centres without role specific training and had to be trained on the job.

# Event Background

# Event Background

Understanding the context in which the response to STC Seroja was operating is crucial to understanding the findings arising in this report.

The impacted area:

- Was estimated at more than 133,000km$^2$,
- Covered remote townsites and communities with limited backup in infrastructure,
- Crossed the coast in a non-cyclonic rated wind zone area (which dictates building requirements as per Australia and New Zealand Standards),
- Occurred during a pandemic that included a lockdown of the capital city during response and transition to recovery operations, and
- Occurred during school holidays, where COVID-19 related border closures had significantly increased local tourism.

These factors increased the career and volunteer resourcing requirements, increased the complexity and uncertainty regarding initial situational assessment, and increased the number of impacted persons due to holidaymakers.

## Size/Scale

STC Seroja's impact area was larger than the state of Tasmania and equivalent to 60% of Victoria. The size of the incident was defined by the extent of the damage assessments.

Over 40 towns and communities were directly affected by the cyclone. STC Seroja crossed the coast near Kalbarri as a Category 3 cyclone and continued south-east across WA, finally devolving to a tropical low near Merredin, having covered approximately 600 kilometres in ten hours. Requests for assistance from impacted communities were identified from Kalbarri through to Northam. Travelling by road between these two points takes approximately six and a half hours.

The size and scale of the event had significant impacts on resourcing, requiring both intrastate and interstate resource mobilisation and coordination to assess and respond to Requests for Assistance (RFA) from impacted communities across the impact area.

## Timing

In early April 2021, the mid-west coast of WA had a high number of holidaymakers enhanced by closed state borders due to COVID-19 restrictions and Easter school holidays. This meant there were approximately 30,000 visitors in the region at the time. This included an estimated 1,000 visitors to the Houtman Abrolhos Islands which lay approximately 80km West of Geraldton in the Indian Ocean. The 2021 Easter school holidays ran from 2-18 April and by the time reports were received identifying a potential cyclone threat, were well underway.

The school holidays increased the number of visitors in the region, which increased the resourcing needs for volunteer and career personnel for initial deployment. The designated operational high threat period for most DFES regions finished on the last Thursday in March 2021, with the metropolitan area due to finish on the last Thursday in April. This end of the high threat period and transition to medium threat coincided with a commensurate reduction of operational rostering arrangements.

## COVID-19

The ongoing COVID-19 pandemic increased the complexity of incident response and management, regarding resourcing. COVID-19 management plans were developed and regularly adjusted to ensure state protocols were adhered to, and interstate resources could be deployed while complying with any COVID-19 requirements.

In addition to standard COVID-19 protocols and movement restrictions requiring consideration, there was a lockdown in Perth between 24 – 26 April 2021, impacting metropolitan deployment, resource coordination, and DFES State Operations Centre (SOC) resourcing:

- The lockdown also applied to metropolitan resources deployed to the incident if they had been in Perth during the exposure period.
- Masks were required to be worn indoors and outdoors if personnel had been in Perth since 17 April 2021.
- Quarantine arrangements were required to be developed for Perth-based personnel who had been at an exposure site during the lockdown period.

Transit arrangements were established for interstate resources involving travel ‘corridors’ and ‘bubbles’ through Perth Airport. Intrastate personnel travelling from non-metropolitan areas required specialised travel and accommodation arrangements.

Maintaining the safety of personnel during the pandemic, while responding to a cyclone significantly increased the burden of incident management and logistics above what would normally be required, even for an event of this magnitude.

## Remoteness and Infrastructure

The location of impacted communities and townsites is important to note. The point of impact on the mid-west WA coast, Kalbarri, is approximately six hours from Perth and has a local population of 1,349[3]. The closest city to Kalbarri is Geraldton, population 37,432 and approximately two hours away.

The land along the mid-west coast is primarily pastoral areas. Although there are some tourist locations. Population density is low and there is limited availability of infrastructure or maintenance/resupply options that were available to support emergency operations and the impacted communities. Most essential services and infrastructure had limited to no available redundancy.

The size, distances of travel and remoteness of the impact area is critical to understand when considering the capacity and capability of the impact area to support emergency management operations. Roads, power, and telecommunications were all impacted by the cyclone, and the distance to major centres and between impact sites meant restoration times were extended. The nature of impacted communities meant accommodation and catering options were extremely limited, requiring additional logistical efforts to ensure responders were not overwhelming the local resources.

## Previous events

Regional resources were already stretched following a previous flood event in the Gascoyne River in February 2021 caused by a slow moving Tropical Low (TL). Heavy rain in the Kimberley Region also impacted the Great Northern Highway representing one of the key transport routes in the north of the state.

Although these events did not directly impact the incident area for STC Seroja, they impacted the Local Government (LG), volunteers, and state government agencies in the Midwest Gascoyne (MWG) who were later required to take part in the cyclone response.

[3] 2016 Kalbarri, Census All persons QuickStats | Australian Bureau of Statistics (abs.gov.au)

# Incident Outline

# Incident Outline

## Pre Impact – Monitoring and Preparation

STC Seroja first started as a tropical low (TL22U) off the eastern coast of Indonesia on 2 April 2021, intensifying to a Category 2 Tropical Cyclone on 5 April 2021. STC Seroja caused widespread flooding and landslides across southern Indonesia resulting in an estimated 200 deaths.

Initial tracking of STC Seroja as it weakened and left Indonesian waters indicated there was a low chance of impact to the Western Australian coast and it was likely to track in a south westerly direction and remain offshore. Concurrently, a second weather system near Christmas Island, TL23U (later TC Odette), was being monitored and it was believed unlikely to become a tropical cyclone or interact with STC Seroja.

STC Seroja was reclassified to Category 1 on 7 April 2021, with the potential to cross the coast between Carnarvon and Geraldton some days later.

The first Public Information Cyclone Warning advice was issued 8 April 2021 at 15:37hrs by Geraldton Marine Rescue VHF Radio Broadcast, with DFES initiating and the Bureau of Meteorology (BoM) releasing a Tropical Cyclone Warning 'Cyclone Advice' shortly after for areas between Onslow to Jurien Bay within DFES regions of Midwest Gascoyne and Pilbara.

As at 22:54hrs on 8 April 2021, STC Seroja was sitting 550km NNW of Exmouth and moving SSW at approximately 12kph. It was identified there was the potential for STC Seroja to be affected by TL23U (TC Odette), which was located 640km South of Christmas Island reducing the certainty of STC Seroja's track. It was believed that STC Seroja would likely make landfall between Carnarvon and Jurien Bay.

Concerns were raised that TC Odette could possibly strengthen and interact with STC Seroja, pushing the latter south into the Pilbara coast. This phenomenon is referred to as the Fujiwhara effect[4] and occurs when two cyclonic vortices in proximity gravitate towards each other, with the smaller of the cyclones being absorbed by the larger and increasing the intensity and impact. When this occurs tracking of the two cyclones becomes more difficult and less predictable.

At 15:45hrs on 9 April 2021, an Emergency Situation was declared for Shires of Chapman Valley, City of Greater Geraldton, Irwin, Northampton, and Shark Bay, with BoM issuing a 'Blue Alert' Tropical Cyclone Warning at 16:00hrs for areas between Coral Bay and Lancelin. STC Seroja was upgraded to a Category 2 cyclone that evening and TC Odette was upgraded from Tropical Low to Category 1 cyclone.

On 10 April 2021, TC Odette was tracking along the northwest coast but was not forecast to cross land and was likely to be downgraded to a tropical low. Adding to the complexity of preparations for possible impact, a further tropical low, TL24U, off the NW coast near the Cocos (Keeling) Islands was identified on 10 April 2021, also requiring monitoring.

[4] When cyclones collide: the Fujiwhara effect - Bureau of Meteorology (bom.gov.au)

Community messaging was issued via radio interviews with DFES personnel, Emergency WA, and impacted local governments on 10 April 2021 to advise people camping in tents and caravans they are not safe and need to evacuate now or seek safer accommodation. Evacuation directions were given for Houtman Abrolhos Islands, with some permanent residents and visitors of Horrocks Beach, Port Gregory and Lucky Bay refusing to evacuate.

Pre impact briefings from the Department of Water and Environmental Regulation (DWER) advised that due to the age and condition of buildings and homes in Northampton and Horrocks there will likely be airborne asbestos and emergency crews should wear PPE.

As the cyclone tracked further south, DFES Midwest Gascoyne Regional Operations Centre (ROC) located in Geraldton lay in the predicted path of the cyclone. As a result, control was transferred to Kimberley ROC in advance of the cyclone crossing the coast to mitigate any potential impacts on incident management capability.

## Impact and Response

The BoM issued a 'Red Alert' Tropical Cyclone Warning (TCW) at 09:00hrs on 11 April 2021 for Shark Bay, with a further warning issued at 11:00hrs advising STC Seroja had intensified, was upgraded to Category 3, and was heading toward the WA coastline.

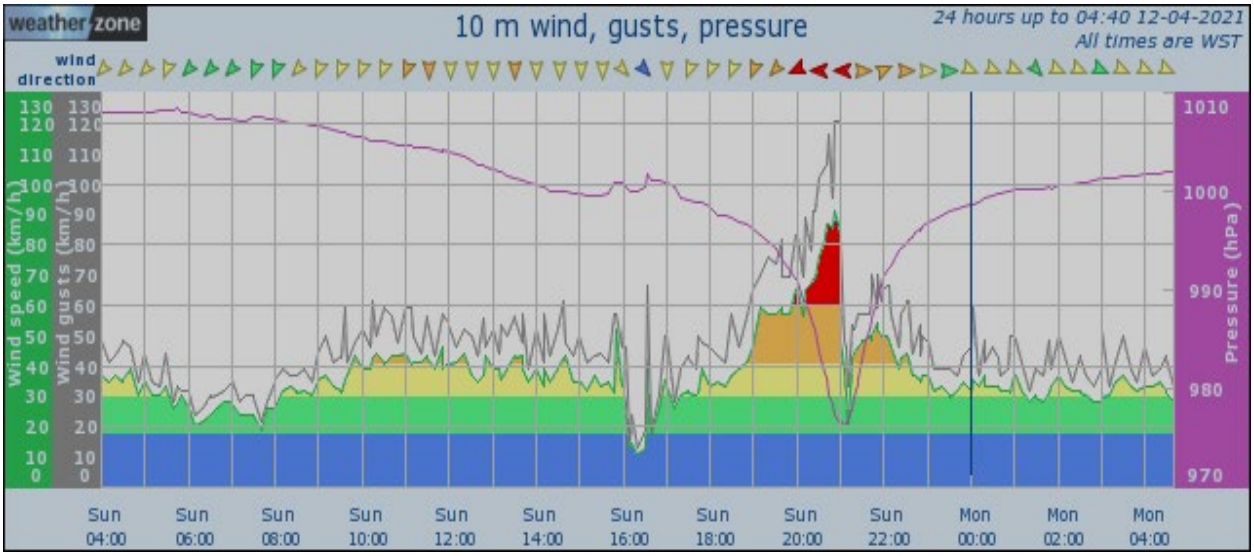
An Emergency Situation was declared on 11 April 2021 at around 15:50hrs for local government areas within the DFES MWG, Goldfields Midlands (GM) and North-East Metropolitan regions.

Preparations for impact were well underway, with a Level 3 Incident Management Team (IMT) (lite) mobilised for initial deployment.

STC Seroja crossed the WA coastline over the town of Kalbarri at 19:00hrs on 11 April 2021, with wind gusts of 125-170km/h recorded at Meanarra tower near Kalbarri. The incident was declared Level 3 (a major emergency) at 20:20hrs.

Initial assessments reported significant damage to Western Power substations and infrastructure resulting in 26,000 customers being without power and downed lines that could not be isolated creating a risk to life. Extensive losses and widespread damage to homes and businesses were reported in Kalbarri and Northampton. Telecommunications were impacted with 107 x 3G, and 79 x 4G mobile base stations lost.

STC Seroja weakened to Category 2 near Dalwallinu at midnight on 12 April 2021, tracking in a south-east direction at 65kph with wind gusts between 60-80kph. It was further downgraded to Category 1 at 02:00hrs and weakened to a tropical low near Merredin, expected to reach Esperance by 11:00hrs on 12 April 2021.




*Surface wind and air pressure observations from Geraldton Airport. The spike in wind and drop in air pressure shows when the eye of Seroja passed close to the airport. Source: www.weatherzone.com.au*

Reports of damage continued to be received in Carnarvon, Shark Bay, Kalbarri, Horrocks, Port Gregory, Northampton, Chapman Valley, Geraldton, Mullewa, Morawa, and Mingenew.

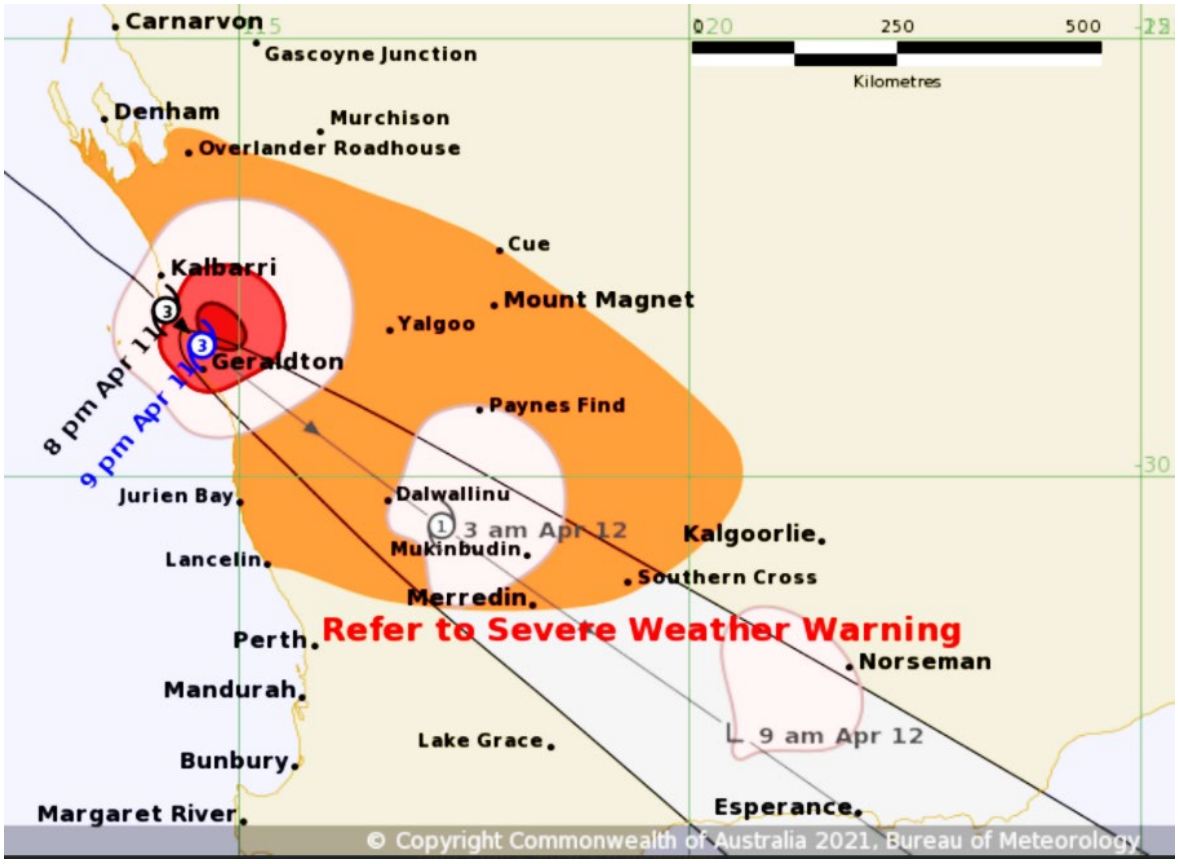
Control was handed back from the Kimberley ROC to the MWG ROC at midday on 12 April 2021. A Level 3 IMT, DFES Assistant Commissioner, and communication support arrived at Geraldton Incident Control Centre (ICC) at approximately 14:00hrs on 12 April 2021, with an additional 147 personnel arriving in Geraldton that evening. Resourcing requirements continued to be a challenge throughout the response and transition to recovery due to the contextual factors previously described.

Due to the size of the impacted area and the limited connectivity and communications, the incident management team structure was separated into seven divisions: six operational divisions based in Geraldton, Kalbarri, Northampton, Tardun, Morawa, and Wubin, plus a functional division based in Kalbarri. The purpose of the functional division was to monitor and mitigate against immediate hazards presented by asbestos, and aid in the transition to recovery.

Each operational division was responsible for incident management at a local level, with resources both interstate and intrastate allocated across all divisions. Key tasks performed at a divisional level were focused on response and the transition to recovery and involved a high level of interaction with the local communities.

Due to the remote location deployments were most often on a 1-5-1 basis, with responders typically having a nominated travel day, five days at the location, then a return travel day.

The emergency management structure included the DFES SOC and MWG ROC providing strategic oversight and intelligence in addition to liaising with other government agencies. To enable better interoperability, the DFES SOC incorporates representatives from all relevant hazard and combat agencies and other partner organisations e.g., AHLG and Essential Service Network Operators (ESNOs) to ensure incident information is relevant, informed, and available to all agencies as required.




*The predicted cyclone track showing expected areas of impact as of 11 April 2021. Map issued as part of the Severe Weather Warning. Source: BoM*

The DFES SOC initiated requests for interstate and ADF assistance on 12 April 2021 with a total of 68 ADF personnel deployed over the course of the incident, and a total of 205 interstate support members arriving from 13 April 2021. Interstate and Federal assets were also requested and utilised, including heavy-lift aircraft, transportation vehicles and additional tents and accommodation.

There were significant resourcing efforts deployed to assist in the STC Seroja response and transition to recovery. This was a multi-agency effort involving DFES uniformed and non-uniformed personnel, volunteers, local governments, other state government agencies, interstate teams, and the ADF, working with the local community including spontaneous volunteers and community-led assistance initiatives.

*State Emergency Services (SES) vehicle driven off a Royal Australian Air Force aircraft in response to STC Seroja. Source: DFES*

Observations gathered from both intrastate and interstate personnel involved with the event consistently noted positive interpersonal relationships and camaraderie between personnel, regardless of home organisation, as a significant positive contributor to the operational experience.


*Victorian SES vehicle driven off a Royal Australian Air Force C-17 Globemaster III aircraft in Geraldton in response to STC Seroja. Source: ADF*

## Move to Recovery

The total impact area of STC Seroja was assessed as over 133,000 km$^2$. In total, DFES personnel completed 3,208 Rapid Damage Assessments (RDAs) and 1701 RFAs across 3,120 shifts in incident management and response roles. 26,000 properties were impacted by power outages in the initial aftermath of the cyclone; by the time the transition to recovery was underway 558 connections were outstanding.

While this review focuses on the main period of operational response from 8 April to 1 May 2021, the impacts of the cyclone are still being addressed through recovery ongoing efforts.

To oversee recovery, a State Recovery Controller was appointed 15 April 2021, with a recovery team appointed shortly after.

On 17 April 2021 STC Seroja was declared an eligible event for Disaster Recovery Fund Arrangements (DRFA) to provide initial assistance for eligible residents and support for 16 impacted LGs.

DFES State Recovery is monitoring and evaluating all activities to assess the effectiveness of State-level recovery coordination arrangements. The SEMC policy requires relevant local government(s) to undertake an evaluation of the effectiveness of the recovery activities in relation to its recovery plan, including an assessment of preparedness for any future event.

*DFES USAR technicians and SES volunteers working together as part of the RDA/RFA process.*

## Resourcing

The response to STC Seroja and transition to recovery required a high level of resourcing over an extended period, equivalent to 3,120 shifts across 48 different emergency management roles. The table below summarises the number and type of personnel deployed as recorded in the DFES web system used to capture resources during an incident. Note: these figures are based on individuals deployed, and therefore do not reflect total number of shifts completed or roles undertaken, as some individuals deployed multiple times and/or undertook multiple roles.

*Number of personnel deployed to STC Seroja response and transition to recovery during the period 8 April to 1 May 2021. Data source: DFES WebEOC and AFAC National Resource Sharing Centre.*

| Agency | # Personnel |
|---|---|
| Volunteer | 637 |
| DFES | 214 |
| Interstate Agencies | 205 |
| State Government | 110 |
| Federal Government | 68 |
| Uncategorised | 41 |
| Contractors | 38 |
| Essential Services | 13 |
| Non-Government Organisations | 6 |
| Local Government | 4 |
| Total | 1336 |

*Note: the table figures do not include the vast number of community-led initiatives or spontaneous volunteers. The 'Uncategorised' label refers to personnel who were recorded in the system as having completed a shift but were unable to be assigned to the correct agency due to system connectivity issues or other limitations.*

As identified in the above table, the sustained resourcing for STC Seroja was significant. This resourcing was required in addition to the base level of DFES operations, with DFES personnel and volunteers responding to 2,342 other incidents across the state between 9 April and 7 May 2021 (an average of 80 per day). This number was not unusual for the time of year but assists in identifying the required base level of resourcing required to sustain DFES operations.

# Lessons

# Lessons Management

The purpose of Lessons Management is to provide a consistent approach for the collection, analysis and sharing of lessons in a way that ensures action is taken to effect change and improve DFES' performance. Lessons Management can facilitate learning, both at local level and organisationally, resulting in improved operational practices, safety outcomes and the capture and use of knowledge.

DFES Lessons Management follows a process based on the Australian Institute for Disaster Relief (AIDR) Lessons Management Handbook known as OILL.

- Observations are a noteworthy fact or occurrence that someone has heard, seen, noticed, or experienced as an opportunity for improvement or an example of good practice.
- Insights are deductions drawn from the (observations) which needs to be further considered. Insights occur when there are multiple similar observations or a single observation which poses a high risk to personnel or DFES. An insight defines the issue, not the solution.
- Lessons may be drawn from insights and present new or enhanced knowledge for the organisation in other words we are searching for blind spots. This distinguishes them from insights.
- Lessons Learned occur once the approved change is implemented, shared and long lasting. One measure of success will be the decline of similar observations over time.

## Data Collection

Data collection for the AAR was undertaken late 2021. Observations were collected via methods, including:

- Surveys
- Interviews
- Questionnaires
- Workshops
- Operational debriefs

This process resulted in nearly 800 observations being recorded.

## Data Analysis

These collected responses were themed and coded against the State Capability Framework or the POiSTED[5] capability model depending on whether they were a tactical or systemic observation to enable further targeted analysis of the provided information. Coded observations were then compared and validated against a review of documented incident information available evidence from the incident.

[5] POiSTED – Personnel, Organisation, information, Support, Training, Equipment, Doctrine

# Lessons Identified

Through the conduct of this report, specific lessons were identified regarding community risk awareness, DFES organisational financial processes and DFES damage assessment system interoperability; co-ordination of public communication and resource management; these represent new explicit knowledge or understanding for the organisation.

***Lesson 1:*** *Emergency Management planning needs to consider the social environment, including transient populations, with an understanding of community risk awareness, to ensure critical communications are clearly understood, and followed.*

Community awareness of risk was focused on hazards likely to occur more frequently than cyclone, even if the potential consequences of a low frequency hazard are greater.

Whilst this lesson was derived from a relatively small number of submissions, the sources of these observations are identified as having a high level of local understanding due to their roles as agency representatives in the impacted regions.

Responses consistently observed the impacted communities had little understanding of cyclone risk and potential impacts, as cyclones have not been the prevalent hazard in that area. This led to the underestimation of personal risk in some cases. Even for those who were aware of, and understood the risk, difficulty absorbing the required information during a time of stress and uncertainty was noted.

Observations and insights themed against the Core Capability areas of Governance and Community Involvement, identified that whilst cyclone risk was identified in Local Emergency Management Arrangements, EM planning could be improved with further focus on community risk awareness and understanding associated with the hazard. Many of the impacted areas are more accustomed to dealing with bushfire rather than a cyclone, and therefore community understanding, and EM planning processes were developed with a bushfire focus. There may be benefit in exploring a hazard-agnostic approach to educate community about the likely risks in their area and more specific focus on the necessary actions and behaviours required to prepare, respond and recover from cyclones.

***Lesson 2:*** *Incident-specific financial processes and suitable personnel, are required to ensure appropriate financial administration during an incident.*

The volume of expenditure and financial acquittals overwhelmed some Incident Management Teams, due to a lack of robust processes and without suitable personnel allocated to these roles.

Large-scale incidents carry a high administration burden with urgent, concurrent, and competing demands for financial support. Difficulties were noted relating to managing expenditure in line with required financial process[6].

Observations received regarding financial administration were consistent, highlighting processes and procedures specific to major incidents were not mature and there was no role to support financial management in the IMT[7].

- Due to the high volume of expenditure required to support operations and the lack of supporting documentation, financial processes were ad-hoc and inconsistently applied.
- The introduction of interstate resources into IMTs compounded the issue; with no documented incident expenditure processes to assist them, resulting in additional delays in procuring required goods.
- Initial feedback from LG and Western Australia Local Government Association (WALGA) noted the Disaster Recovery Funding Arrangements Western Australia (DRFAWA) process of approval was slow, impacting their ability to implement recovery actions. Further reporting of the DRFAWA process is expected post-recovery operations.

[6] Changes have been made to WebEOC with a view to streamlining the financial aspects of an operation. This was tested during the latest (September 2022) annual pre-season bushfire exercise. The evaluation report for the exercise has not yet been finalised to ascertain the effectiveness of this change.

[7] During the latest (September 2022) annual pre-season bushfire exercise, an internal Finance Services subject matter expert was included in the Incident Management Team to assist in real time. The evaluation report for the exercise has not yet been finalised to ascertain the effectiveness of this change.

***Lesson 3:*** *Critical sources of data to support decision making must be understood prior to them being relied upon as a source of truth.*

During large scale events, the sheer volume of data available and actions being undertaken, can hamper the ability to accurately analyse information rapidly.

Furthermore, natural hazards have an additional data set to consider, the Request for Assistance (RFA) process. This information is collected via the 132 500 number where community members request assistance for State Emergency Service (SES) volunteers to respond.

Multiple sources mentioned the incompatibility of the Urban Search and Rescue (USAR) Rapid Damage Assessment (RDA) process with the SES RFA process, and the requirement for manual intervention to ensure the data was useful and valid for the STC Seroja IMT. Due to system limitations, USAR datasets were held separately to IMT datasets and manually compared to RFAs; this process meant damage identified in RDAs was not necessarily addressed through RFA process as it was reliant on manual identification. Even if the two systems could communicate, there are gaps in the data collected by the RDA process and what was required to identify and prioritise RFAs.

While this posed challenges, the use of data in incident based decision making will be enhanced by greater understanding of the available data sets and is expected to mature over time.

***Lesson 4:*** *There is opportunity to reinforce DFES public information mechanisms as the single source of truth for public information.*

Public communications during response and recovery were varied and considered to be mostly effective. Therefore, it is essential to sustain the use of different media sources.

The FES Commissioner as the HMA, has responsibility for public information for hazards of which they are prescribed.  In this incident, DFES provided timely information to the community which is positively reflected in the observations.

Responses did reflect that where information was passed on via other channels, (for example community groups, Facebook messages) the information may not have been the most recent advice.

Noting the amount of public information required in this dynamic weather event, it is important for all EM planning to reinforce responsibility of the HMA and DFES, as the credible source of public information.

Observations received demonstrated there was confusion with regards to the timing of the removal of the red alert. This confusion was increased due to conflicting messaging from community level communications outside of the DFES issued public information.

Observations were received in relation to the evacuation of areas in the path of STC Seroja and the clear nature of these communications and community actions. Given the nature of the islands in the impact area being remote, low-lying and with a lack of cyclone rated infrastructure, it was essential warnings were broadcast early to provide clear and consistent notifications. This was targeted via local trusted communication channels, and with the lack of negative feedback, it can be inferred it was done so effectively.

It should be noted, the messaging around evacuation centres appears to have room for improvement. This will likely improve with a review of procedures around local emergency management plans, which has been outlined earlier in this report.

***Lesson 5:*** *Develop an improved natural hazard IMT capability, including appropriately skilled personnel through targeted training.*

The inability to locate suitably trained personnel meant that a percentage of personnel were deployed to the incident or operations centres without role specific training and had to be trained on the job.

The observations identified various areas of concern around having appropriately trained and available staff in key roles within the emergency operations centres and IMT. It was identified, during the extended period for response and transition to recovery, the IMT depleted key functional roles, which resulted in multiple deployments for staff.

Resourcing for incidents is drawn from several areas, including career and public service officers, volunteers, emergency management partner agencies and often supported by members of the community. Incidents such as STC Seroja are often highly resource intensive. It is important to note, that DFES is responsible to not only deploy resources to active incidents, but also prepare for emerging incidents. In the financial year 2021/22 DFES responded to around 28,000 incidents, throughout Western Australia.

An increase in training across all DFES Hazard Management Agency (HMA) responsibilities, would likely reduce the level of impact this may have in future incidents. It is critical for both uniformed and non-uniformed personnel to have access to appropriate training to ensure DFES has the capacity and capability required to manage large scale incidents. In addition, work is required to consider an improved natural hazards IMT capability. This should consider implications for resourcing requirements should concurrent emergencies be active and the draw of resources across DFES noting a level of preparedness is required.

# Conclusion

STC Seroja resulted in significant community impact over vast areas, with the recovery actions still ongoing.

The commitment of the community, DFES and other emergency management partners, noticeably demonstrated community spirit and a willingness to help.

The review conducted into the operational response, identified by in large, under the circumstances, there were a number of positive factors that made a difference to the community in the immediate aftermath, however there are also areas identified where improvement can be made.

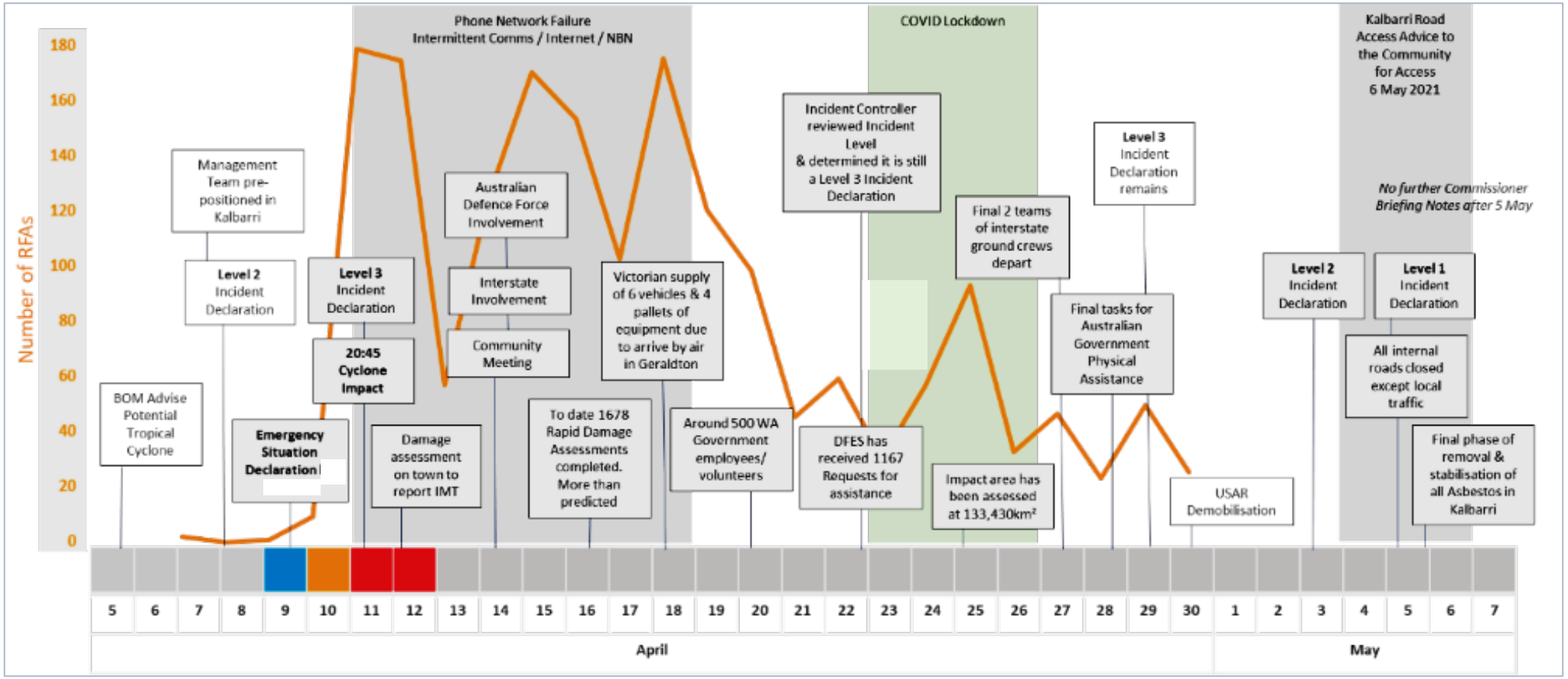
Through the conduct of this report, specific lessons identified related to community risk awareness, DFES organisational financial processes and DFES damage assessment system interoperability; co-ordination of public communication and resource management; these represent new explicit knowledge or understanding for the organisation. These will be areas for consideration as we seek to continually improve our operational response to emergencies, in order to minimise the impact of emergencies on communities.

# Appendices

## Appendix A - Glossary

| Acronym | Meaning |
|---|---|
| AAR | After Action Review |
| ADF | Australian Defence Force |
| AFAC | Australasian Fire and Emergency Service Authorities Council |
| BGU | Brigades, Groups, Units |
| BoM | Bureau of Meteorology |
| DFES | Department Fire and Emergency Services |
| DRFA | Disaster Recovery Funding Arrangements |
| DRFAWA | Disaster Recovery Funding Arrangements Western Australia |
| DWER | Department of Water and Environmental Regulation |
| EM | Emergency Management |
| ESNO | Essential Services Network Operators |
| FES | Fire and Emergency Services |
| HMA | Hazard Management Agency |
| IMT | Incident Management Team |
| LG | Local Government |
| MWG | Midwest-Gascoyne |
| NGO | Non-Government Organisation |
| PPE | Personal Protective Equipment |
| RDA | Rapid Damage Assessment |
| RFA | Request for Assistance |
| ROC | Regional Operations Centre |
| SEMC | State Emergency Management Committee |
| SES | State Emergency Service |
| SOC | State Operations Centre |
| TC | Tropical Cyclone |
| TCW | Tropical Cyclone Warning |
| TL | Tropical Low |
| USAR | Urban Search and Rescue |
| VHF Radio | Very High Frequency Radio |
| WALGA | Western Australia Local Government Association |
| WebEOC | Web Emergency Operations Centre (DFES Incident Management system) |

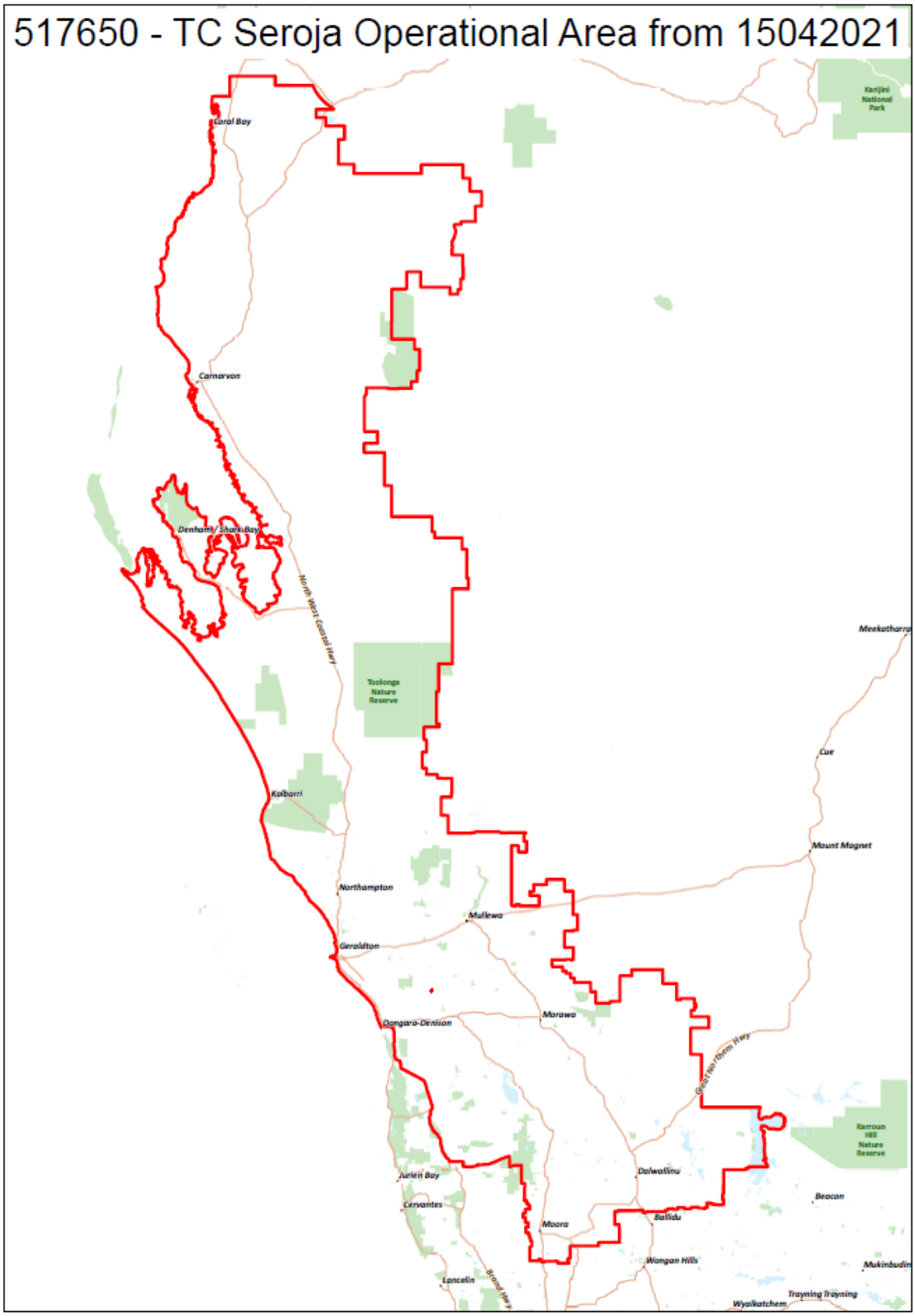
# Appendix B - Timeline




April-May 2021 Timeline of Cyclone, Response and Recovery

# Appendix C – Map: Operational Area

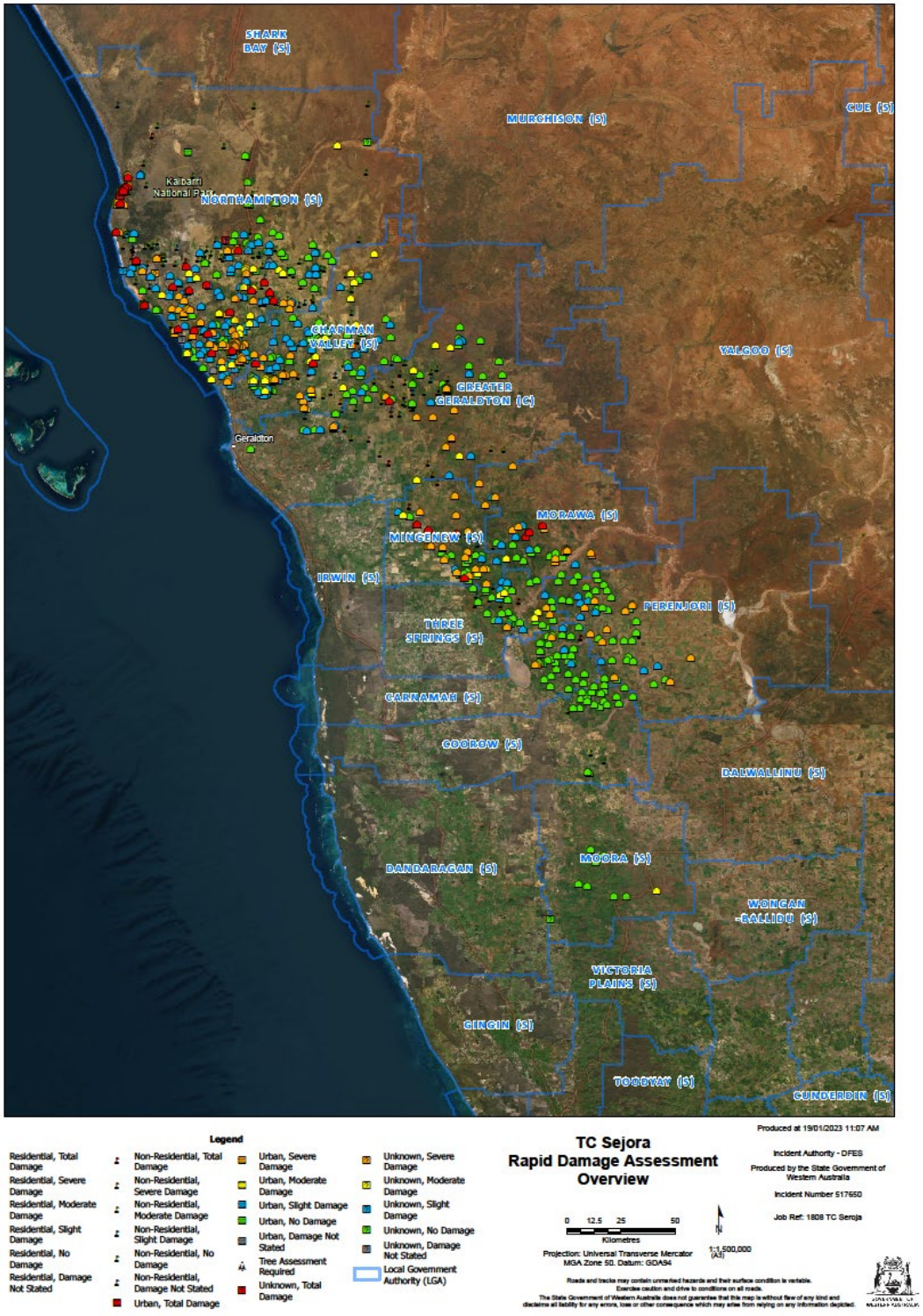
This map shows the operational area of the STC Seroja response and transition to recovery.



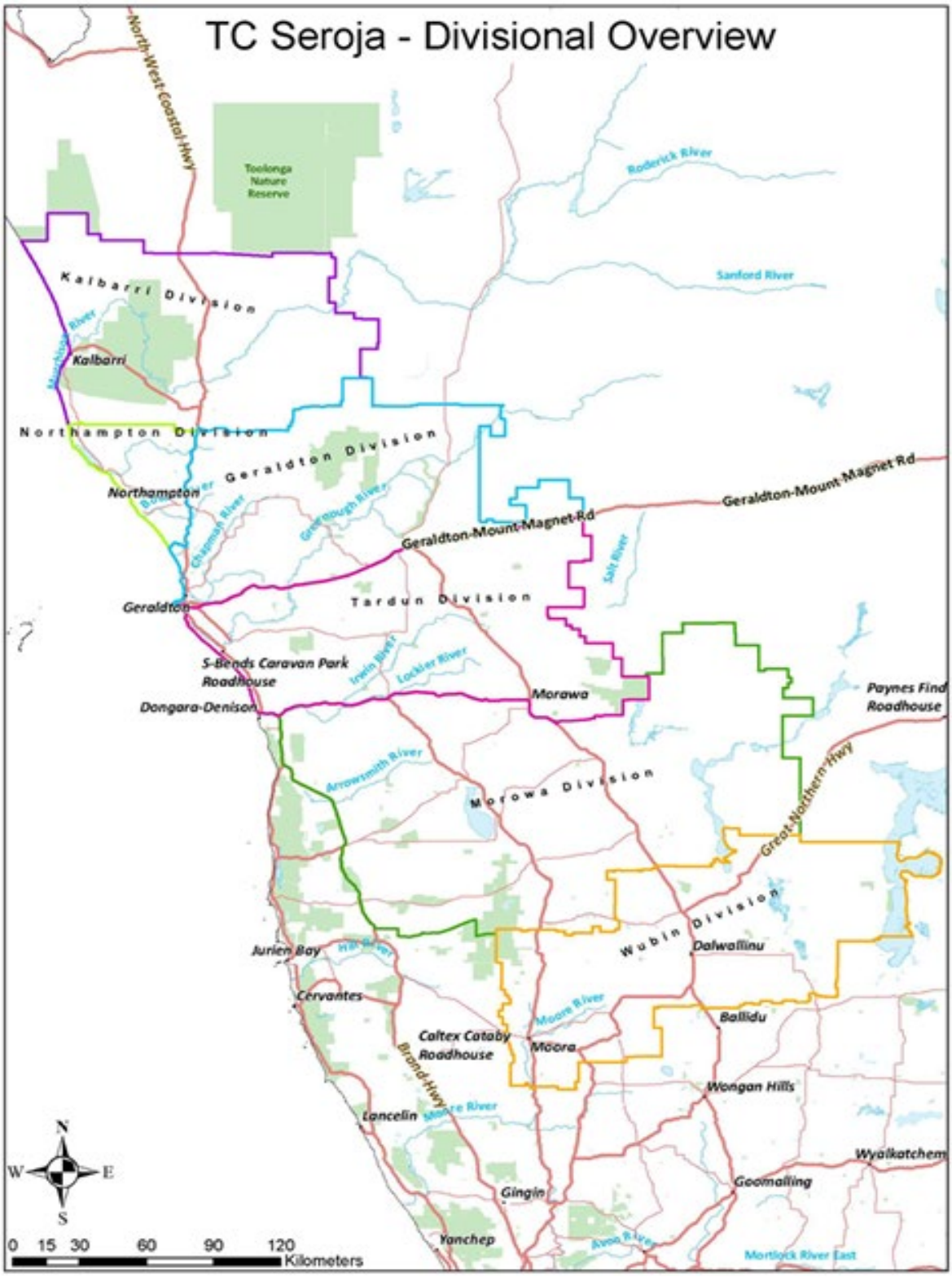

*STC Seroja Operational area as of 15 April 2021. Source: Geraldton ROC report, WebEOC*

# Appendix D – Map: Damage Assessments

The below image is a map showing the extent of the rapid damage assessments completed by Urban Search and Rescue (USAR) as a result of STC Seroja.

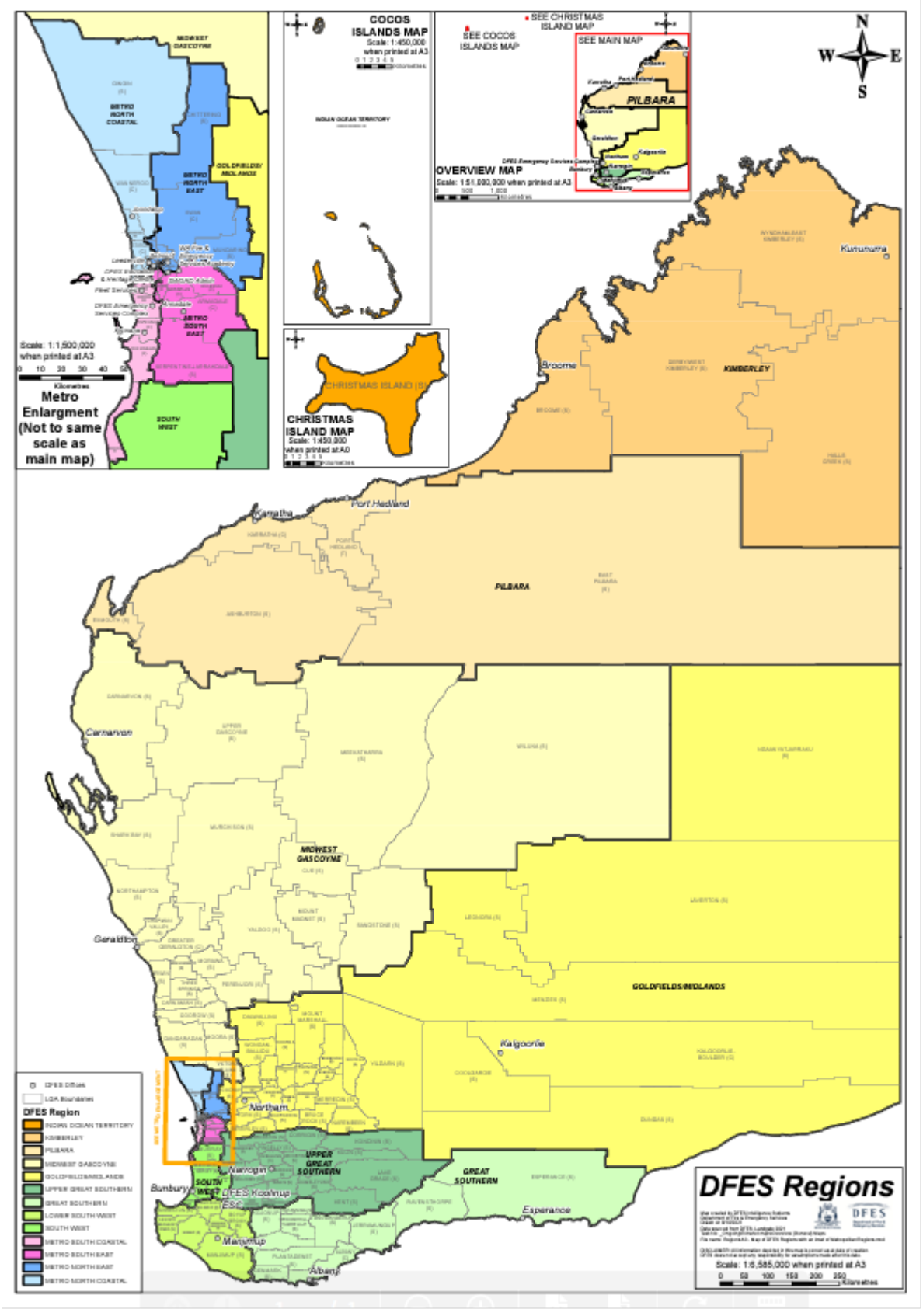


# Appendix E – Map: Divisional Overview




*STC Seroja operational divisions as of 12 April 2021. Source: DFES WebEOC*

# Appendix F – Map: DFES Region




*Map of DFES Regions. Source: DFES FESMaps*

dfes.wa.gov.au

GOVERNMENT OF WESTERN AUSTRALIA

DFES Department of Fire & Emergency Services

FOR A **SAFER STATE**