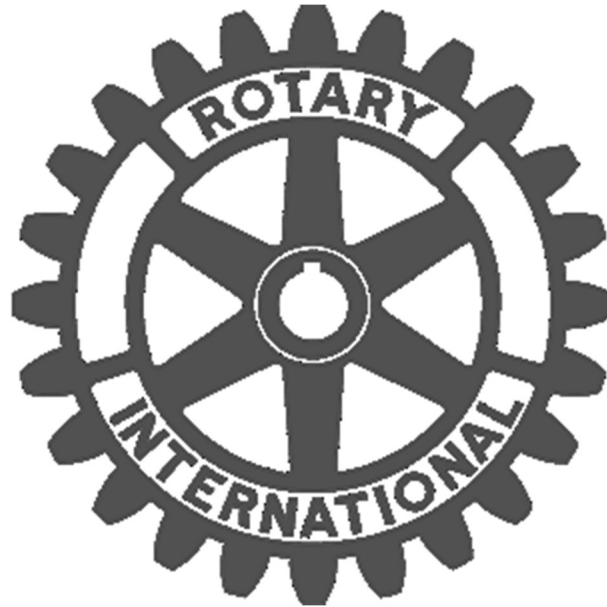


# Vocational Training Team report



## Forest Fire Management. Bushfire and Prescribed Fire

Rotary Global Grant Project (GG 2099432):

Eucalypt Forest Fire Management

29<sup>th</sup> November 2023

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## Context

Rotary Foundation's Forest Fire Management Vocational Training Team (VTT) between Portugal's Ponta Delgada, S. Miguel (Açores) (District 1960) and Australia's Rotary Club of Ballarat South (District 9780) was designed to build forest fire management capacity and capability within Portugal.

Funding was made available through a Rotary Foundation Global Grant for community economic development (GG2099432) to cover the cost of experts from Australia to travel to Portugal, and for Portuguese people to travel to Australia, for prescribed burning experience in fuel and biodiversity management of Western Australia southern forests.

The Vocational Training covers prescribed burning for bushfire mitigation; bushfire preparedness and predictive services; bushfire incident management; and guidance in global collaborative bushfire research, across multiple organizations and disciplines within Portugal.

The Global Grant Application was approved on the 7th of October, 2020 with a commencement date expected to be in May, 2021. However, health and travel restrictions, due to the global pandemic of Covid-19, caused a delay in the VTT's implementation until November, 2022. This report shows the second part of the program that consisted in a visit with portuguese technicians from some of the entities part of the Rural Fires Integrated Management System (Sistema de Gestão Integrada de Fogos Rurais - SGIFR). The participants were indicated by the board of directors or national command of each organization. From Agência para a Gestão Integrada de Fogos Rurais - AGIF, João Quadrado, from Autoridade Nacional de Emergência e Proteção Civil - ANEPC, Carlos Carvalho, from Guarda Nacional Republicana - GNR through the Unidade de Emergência Protecção e Socorro - UEPS, Bruno Lopes, from Instituto da Conservação da Natureza e das Florestas - ICNF, Carlos Loureiro and from ForestWISE - Laboratório Colaborativo para a Gestão Integrada da Floresta e do Fogo Rui Pinto. Jorge Picão, a representative from AFOCELCA (a private firefighting company in Portugal) also was part of the team, participated in the entire program but the expenses were accommodated on their own.

This part of the program was developed between October 21st and November 13th of 2023 with the following appointed goals:

- Attend the Bushfire Centre of Excellence at Nambeelup, Western Australia (WA);
- Participate in prescribed burning operations being developed in Western Australia, planning and operational aspects of prescribed burning for pine and natural eucalypt forests;
- Interact with different agencies, organizations and persons related with fire management;
- Increase the contact network between organizations in both countries;
- Identify good practices and methodologies already in place in WA that are possible to be implemented in Portugal.

The visit program was prepared in conjunction with the Department of Biodiversity, Conservation and Attractions (DBCA) and the Department of Fire and Emergency Services (DFES) of Western Australia.

## Portugal vs West Australia: some similarities and differences

Both Portugal and the visited areas southwestern forest of WA have a mediterranean climate, characterized by hot, dry summers and mild, wet winters. Western Australia's climate is much more varied due to its size but the region that was visited between Perth and Albany, is quite similar to Portugal.

In terms of size, Western Australia, the largest state in the whole country, is significantly larger than Portugal, covering an expansive area of about 2.6 million square kilometers, in contrast, Portugal is a much smaller country, covering an area of approximately 92,000 square kilometers. This significant disparity in size highlights the vastness of Western Australia in comparison to Portugal. However, the landscape and the diversity of ecosystems and habitats is not only abundant in both countries but, in some regions, very similar making it possible for those more distracted to even wonder in which country they're really in.

Population-wise, Portugal and Western Australia also differ considerably. Portugal is a country with a relatively dense population of over 10.5 million people, making it one of the more densely populated nations in Europe. In contrast, Western Australia's population is significantly smaller, with approximately 2.8 million residents, despite its vast land area.

The land tenure and property size it's another major difference between the realities of the two locations. In Portugal, 97% of the forest land is private and only about 2% is state owned and managed. The private forest land has an average size of 2 ha and if we consider just the north and center regions of the country, this number decreases to 0,5 ha.

Wildfires are a problem shared by both countries. However, its causes diverge as they naturally occur in WA most of the time due to lightning activity (dry thunderstorms). In Portugal human activities related to agriculture, grazing and negligent use of fire are some of the main causes behind wildfires.

## Observations

During the visit the team members travelled across the southwest forest region of Western Australia and identified the observations reported in this chapter. These observations were grouped into eight main topics: fuel management (prescribed burning), training, suppression management, incident management, resource management, technical characteristics of the equipments, emergency alert and warning system and research, development and innovation.

### Training

The system in place uses the training referential from AFAC, allowing a transversal reference of the different entities, states and countries (Australia and New Zealand) to build similar capability that could be shared across.

DFES and DBCA have their own training mechanism within the referential from AFAC but is not transferable between organizations. The training provided to the different types of volunteer fire brigades is managed through DFES, providing a scalable system of competences and knowledge.

There's a mandatory refresher course at the beginning of each season with a duration of 4 hours that targets basic safety behavior, use of equipment and eventual changes to the organization. This safety training uses examples mainly of recent accidents that occurred in Australia as study cases and testimonials from colleagues and family of the victims.

Along with training, technical experience and hands-on experience contribute to the progression of their careers. The majority of people we've met, started as seasonal workers or volunteers and increased their responsibility in the organizations from there.

DFES staff members nonrelated with fire also complete basic courses for firefighting and safety, including the use of equipment and self-protection maneuver in case of entrapment in the vehicle.

### Fuel management (Prescribed burning)

The main mitigation strategy to manage fuels used in Western Australia involves above all the technique of prescribed burning. With the size of the territory to manage, in particular forest areas, and considering the land tenure (between 50%-60% state owned), this is the most used and apparently the most effective and efficient technique that allows results at a landscape level for a fraction of the cost of others. The effort (planning and operationalization) put in prescribed burning is substantial in WA that has allowed over the years, the continuous protection of populations, infrastructure and the environment through the reduction of the size of bushfires and its impacts at a landscape scale.

The focus of the burning program of WA is on natural regrown forest, the team had the opportunity to experience or see results of prescribed burning in *Eucalyptus marginata*, *Eucalyptus calophylla*, *Eucalyptus diversicolor*. In the context of plantation forests, it was also

possible to visit areas of *Pinus pinaster* managed with prescribed fire. The use of prescribed burns in plantations of *Eucalyptus globus* is not common.

The scale operations used in prescribed burns (considering the target of burning of 8% of the forest area each year, which represents approximately 200 000 ha) seem to be adapted to the forested territory, as they are planned on a landscape level mainly considering the risk mitigation in this region, as well as biodiversity purposes.

The planning process is long (2-3 years) and participated by several different agencies. The existence of an on-line platform allows to consult the process and what plots are ready to burn, also including a component for public information, impact on outdoor activities or expected emission of smoke.

Planning and burning priorities are mainly based on fuel age and past fire behaviour, this prioritizes the calendar to conduct the burns, risk mitigation and even response in case of a wildfire event. Burning is usually planned to be reintroduced to the landscape 7-8 years since last fire.

The resources for conducting the burns are shared between several different locations across the state and all the days that fits inside burn prescription are used to burn.

## Incident management

The incidents are organized in three different levels, from 1 to 3, according to the increasing complexity. The incident management teams that are deployed to-level 2 and above incidents are filled with persons from different organizations according to the typology of events and the entity that has responsibility for managing the incident (DBCA or DFES).

There are several pre-formed teams composed by staff both from DFES and DBCA, for bushfire events where each role is already filled by a person with training, experience and previous relationship with other team members. The number of elements in an Incident Management Team (IMT) can vary but there is a high proportion rate between the number of elements in the IMT of a level 3 incident and elements on the ground.

There's a big effort to produce intelligence information (maps, situational reports, meteorological forecasts up to date) that are printed and provided to the participants in the fire. In addition, the DFES Operation Command Centre has a permanent presence of a meteorologist that provides meteorological data interpretation so decisions can be made more accurately.

A specialized system that targets specifically what is a rural urban interface and forest firefighting is in place and the location where each fire starts determines the jurisdiction of the IC in the first phase of the event. As bushfires become more complex and frequent, DFES and DBCA establish the most effective distribution of the active occurrences.

## Suppression management

For different roles developed in fire suppression events, different teams, coming from different types of entities, are allocated to different roles. Some are focused on rural urban interface, mainly the Volunteer Fire and Rescue Brigades (DFES), and others, the DBCA Parks and Wildlife, the Volunteer Fire and Emergency Brigades (DFES) and the Bush Fire Brigades (DFES), are allocated on suppressing fires in the forest. The teams allocated to each event are called and employed according to their capabilities.

An air attack supervision aircraft man-piloted is used in every event where aerial resources are deployed, allowing the air suppression operations being coordinated by air.

The use of heavy machinery supported by fire trucks to work directly on fire suppression is standardized at DBCA.

## Resource management

The recruitment of human resources for the fire teams is suffering an increasing difficulty to find enough elements to fill the crews, particularly in DBCA, as this is not apparent in the Volunteer Bush Fire Service. Equipment like fire trucks and heavy machinery is available but the role is not financially attractive enough to ensure sufficient people to operate it at full capability.

The resources available like trucks, machinery and crews are the same for prescribed burning and fire suppression. This allows a good level of training of the teams with their equipment, team building and knowledge of fire behavior. On the other hand, this situation may create a great amount of stress among teams, as they are constantly involved in both scenarios during all year.

The implemented incident management is similar regardless if the operation is a prescribed burning or a firefighting operation.

## Technical characteristics of the equipment

All the vehicles used for conducting prescribed burning and wildfire suppression are standard. The system to operate the pump, hoses and crew protection is simple to understand and has only minor differences, even if they are from different entities.

The reduced number of requirements for an airfield to operate in the context of bushfire suppression allows the possibility to use more air tracks across the country. The deployment of fuel trucks together with the aerial resources simplifies the refuelling process and increases the ratio of operation of the resources.

The heavy machinery that is deployed for operations is often supported by a truck with fuel and basic maintenance extending the capabilities of this type of resource.

## Emergency alert and warning system

Western Australia has implemented a warning system that provides point-in-time information about a hazard that can be broadcasted as a notification or a recorded voice message in landlines. This system is based in a cell broadcast technology that is not affected by traffic load; therefore, it is very suitable during a disaster when load spikes of data, regular SMS and voice calls usage tend to significantly congest mobile networks, as multiple events have shown.

Broadcast messages are used to send emergency alerts in a defined area instantaneously and are supported by all telecommunication operators, this allows a quicker way to spread the message targeting only the affected area and providing information and instructions related to bushfire events and other emergencies.

## Research, development and innovation

The organizations working on prescribed burning and bushfire suppression conduct their own scientific research, mainly based on operational needs. This is done with internal resources or by using other organizations or agencies where applied research is carried out. This can be seen as an improvement for practical work conducted by technicians, adaptation to new challenges that each of the organization faces or as an anticipation for strategy change or public communication needs.

Although the research is conducted by different organizations with different purposes in different states, they fall inside a national strategy that allows a permanent flow of information and better management of resources.



# Workplan

| DATE              | ITINERARY  | LOCATION                   |
|-------------------|--|----------------------------|
| 22nd october 2023 | Arrive Perth   | Perth                      |
| 23rd october 2023 | Kings Park - History of fire Management/PB in WA                             | Kensington                 |
| 24th october 2023 | Introduction to BCoE - DFES & DBCA PB agenda + meet with Premier             | BCoE                       |
| 25th october 2023 | AM -DFES Cockburn (SOC) + Jandakot Aviation                                  | Cockburn/Jandakot/Mandurah |
| 26th october 2023 | Wellington PB Burning Operations   | Wellington District        |
| 27th october 2023 | Wellington PB Burning Operations   | Wellington District        |
| 28th october 2023 | Weekend - Free time  | Mandurah                   |
| 29th october 2023 | Wellington PB Burning Operations   | Mandurah/Busselton         |
| 30th october 2023 | Blackwood District/Donnelly District interface PB planning                   | Field                      |
| 31st october 2023 | Blackwood District Burning Operations  | Field                      |
| 1st november 2023 | Blackwood District/visit to facilities + Update on Red Book                  | Field                      |
| 2nd november 2023 | Blackwood District/Donnelly District Burning Operations + Experimental burns | Field                      |
| 3rd november 2023 | Blackwood District/Donnelly District Burning Operations                      | Field                      |
| 4th november 2023 | Weekend - Free time  | Busselton                  |
| 5th november 2023 | Weekend - Free time - travel to Frankland District                           | Busselton/Walpole          |
| 6th november 2023 | Frankland District burning operations  | Field                      |
| 7th november 2023 | Visit to local bushfire brigade  | Bridgetown                 |

|                    |   |                   |
|--------------------|---|-------------------|
| 8th november 2023  | Incident Management Team (mixed) + training process   | BCoE              |
| 9th november 2023  | Incident Management Team (DBCA)   | Mundaring         |
| 10th november 2023 | Opportunity to meet the Environment Minister. Opportunity to present to DBCA/DFES on current Portugal approach and a compare and contrast to what we saw in WA. | Perth, Kensington |
| 11th november 2023 | Gnangara Plantations  | Wanneroo          |
| 12th november 2023 | Depart Perth  |                   |

## People interacted

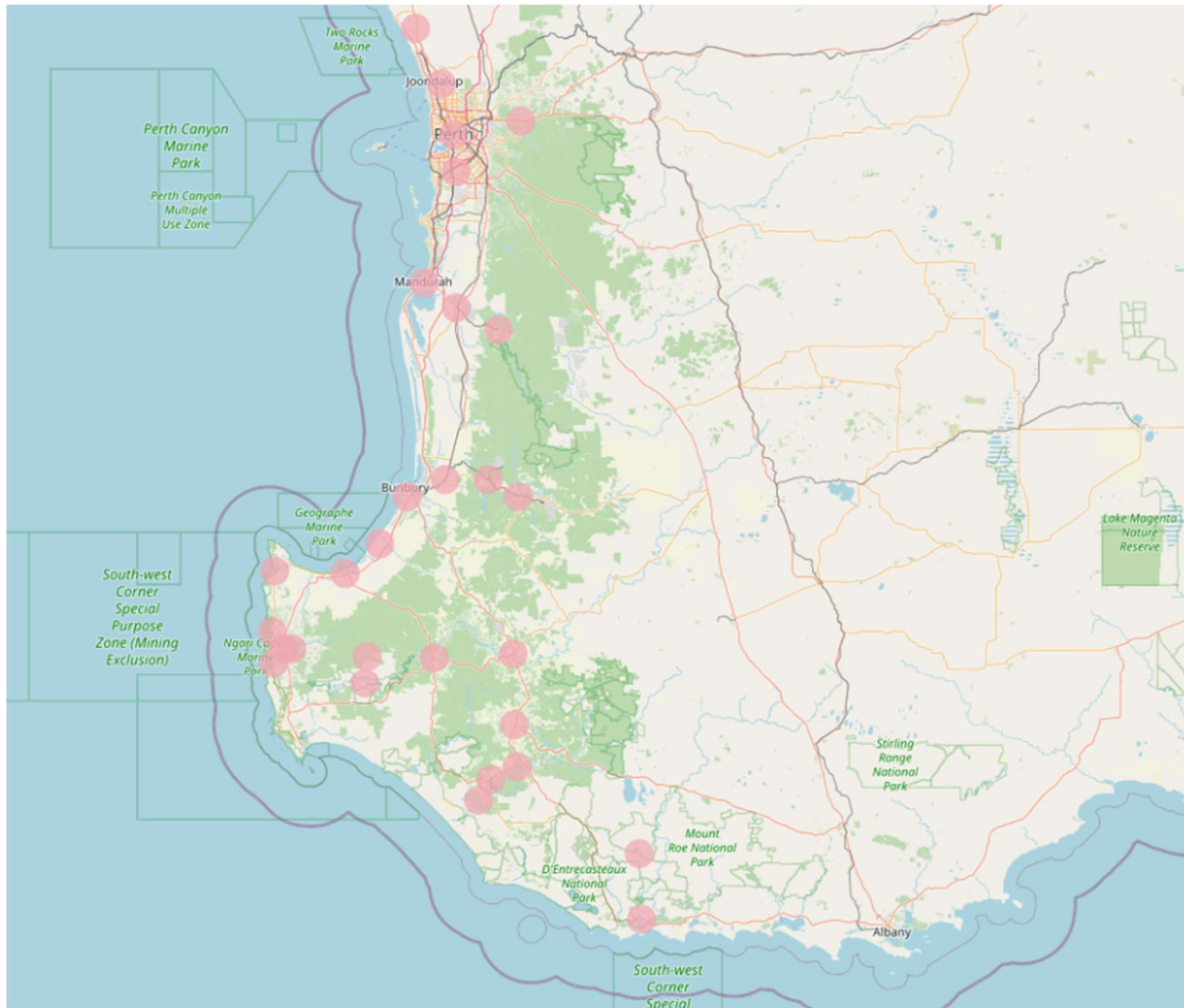
| Name            | Entity/Role   |
|-----------------|---|
| Ineke Oliver    | Rotary District Governor for Western Australia  |
| Pat Schraven    | Rotary District Governor Elect for Western Australia  |
| Gary Morgan     | Rotary Club of Ballarat South   |
| Rick Sneeuwjagt | Rotary Club Past Assistant District Governor for Western Australia                                      |
| John Da Silva   | Honorary Consul of Portugal, Perth Western Australia  |
| Andrew Milne    | Department of Biodiversity, Conservation and Attractions, Regional Fire Services Coordinator            |
| Craig Garrett   | Bushfire Centre of Excellence, Department of Fire and Emergency Services, A/ Chief Superintendent       |
| Gavin Eva       | Bushfire Centre of Excellence, Department of Fire and Emergency Services, District Officer              |
| Jason Foster    | Department of Biodiversity, Conservation and Attractions, Executive Director Regional and Fire Services |
| Craig Waters    | Department of Fire and Emergency Services, Deputy Commissioner  |

|                |  |
|----------------|--|
| Mike Meinema   | Department of Biodiversity, Conservation and Attractions, A/ Manager Fire Management Services Branch       |
| Sue McDougall  | Department of Biodiversity, Conservation and Attractions Director, Kings Park                              |
| Russell Wells  | Bushfire Centre of Excellence, Department of Fire and Emergency Services, A/ Superintendent                |
| John Tillman   | Bushfire Centre of Excellence, Department of Fire and Emergency Services, Chief Superintendent             |
| Trevor Howard  | Australasian Fire and Emergency Services Council National Manager, Prescribed Burning Strategy             |
| Aaron Kain     | Bushfire Centre of Excellence, Department of Fire and Emergency Services, Bushfire Risk Management Officer |
| Roger Cook     | Premier of the Government of Western Australia   |
| Robyn Clarke   | Member of Legislative Assembly, Government of Western Australia  |
| Mike Ayton     | Department of Biodiversity, Conservation and Attractions, Fire Aviation Manager                            |
| Adam Bannister | Department of Fire and Emergency Services, Aviation Manager  |
| Jamie Conway   | Department of Biodiversity, Conservation and Attractions, Wellington District Manager                      |
| Allan Madgwick | Department of Biodiversity, Conservation and Attractions, Wellington District Fire Coordinator             |
| Afie Jazreen   | Department of Biodiversity, Conservation and Attractions, Perth Hills District, Wellington Fire Assistant  |
| Jayden Vitker  | Department of Biodiversity, Conservation and Attractions, Perth Hills District Fire Coordinator            |
| Ed Hatherley   | Department of Biodiversity, Conservation and Attractions, Blackwood District Fire Coordinator              |
| Pedro Palheiro | Department of Biodiversity, Conservation and Attractions, Regional Leader Fire                             |

|                    |   |
|--------------------|---|
|                    | Management Pilbara Region   |
| Owen Donovan       | Department of Biodiversity, Conservation and Attractions, Conservation Leader Swan Coastal District                       |
| Lachie MacCaw      | Department of Biodiversity, Conservation and Attractions, Senior Principal Research Scientist (retired)                   |
| Jennifer Hollis    | Department of Biodiversity, Conservation and Attractions, Senior Principal Research Scientist                             |
| Miguel Cruz        | CSIRO Principal Research Scientist  |
| Ryan Butler        | Department of Biodiversity, Conservation and Attractions, Fire Management Regional Leader Southwest Region                |
| Brad Barton        | Department of Biodiversity, Conservation and Attractions, A/ Manager Regional Fire Services                               |
| Steve Mills        | Department of Biodiversity, Conservation and Attractions, Acting District Manager - Donnelly District, Pemberton          |
| Nikki Rouse        | Department of Biodiversity, Conservation and Attractions, Franklyn District Fire Coordinator                              |
| Chris Sousa        | Department of Fire and Emergency Services, District officer   |
| Rob Brogan         | Department of Fire and Emergency Services, Risk management officer  |
| Cristopher Rumenos | Department of Biodiversity, Conservation and Attractions, Fire Policy & Planning Officer, Fire Management Services Branch |
| Shawn Debono       | Department of Biodiversity, Conservation and Attractions, District Manager, Perth Hills District                          |
| Clayton Sanders    | Department of Biodiversity, Conservation and Attractions, Senior Operation Officer Swan Coastal District                  |
| Stefan de Haan     | Department of Biodiversity, Conservation and Attractions, Manager, Fire Management Services                               |
| Murray Carter      | Department of Fire and Emergency Services, Executive Director Rural Fire  |

|              |  |
|--------------|--|
|              | Division   |
| Reece Whitby | Minister for Environment; Climate Action;<br>Racing and Gaming of the Government of<br>Western Australia |

## Main areas visited



## Acknowledgments

The team would like to thank everyone in DBCA and DFES involved that one way or another was able to take time off their agendas to receive us, talk to us and patiently answer our questions. All members from both organizations that we had the opportunity to connect with were very helpful with their time and knowledge, the team is very grateful to all the involved participants that contributed to the success of the program.

To the Rotary Foundation and Gary Morgan that settled up all the program and received the team in WA.

To Craig Garrett and Gavin Eva that safely got us around, made all the introductory contacts everywhere and pointed out the good pubs.

A special thanks to Pedro Palheiro that guided us through the program and his restless efforts to accommodate new contacts and adjustments that contributed much to the success of the trip. Obrigado!

## Appendix 1: Photographs















