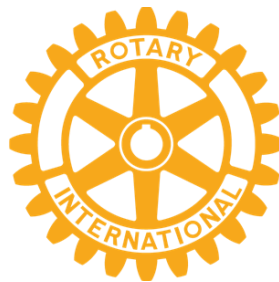




Vocational Training Team report.



Rotary Global Grant Project (GG 2099432):

Eucalypt Forest Fire Management

April 2023

Title page photograph: VTT Participants and guests at final presentation dinner.

From left to right:

Neil Cooper (VTT member,) Ruth Ryan (VTT member,) Pedro Melo(Past President- 2018-19, Rotary Club of Ponta Delgada, S. Miguel (Acores)); Jess Healey (Australian Char·gés d'affaires to Portugal, Australian Embassy, Lisbon); Kevin Tolhurst (VTT member,) Tiago Oliveira (President Board of Directors, AGIF) Gary Morgan (VTT leader,) Ilda Braz (Past District Governor Ilda Braz - 2018/19, and District Coordinator for Polio Plus, Rotary Foundation); Alberto Esteves Guerra (District Coordinator for Global Grant, Rotary Foundation)

Note: Original document (December 2022) was discussed further and revised for release in April 2023.

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Observations and comments.

Portugal and Australia share many common issues in relation to wildfires in forest environments. Both have eucalypts and pines. Both countries are seeing increases in the extent and severity of wildfires due to the combination of Climate Change and high fuel loads brought about by the inappropriate use, or mismanagement, of the forested lands. The environment is changing, and land management needs to change if we wish to sustain our environment, economy, and wellbeing.

Both countries have made mistakes but also have good ideas and practices which we need to capture. Rotary Foundation's Vocational Training Team aimed to provide a sharing of Australian and Portuguese experiences so both may benefit. There are, however, some significantly distinct factors affecting Portugal's forest fire management:

- Legislation restricting prevention and suppression operations.
- Small land parcels and land abandonment which has created difficulties in prevention actions, and the
- Generally higher relative humidity and lower maximum wind speeds affecting forest fires.

This VTT project provided a good opportunity for the sharing of experiences and became a catalyst for discussion amongst and within entities that the VTT met during the visit to Portugal. These discussions should assist in making changes to existing systems to improve Portugal's forest fire management.

The VTT members identified eight key items that appear to limit the efficiency and effectiveness of forest fire management in Portugal. **Each contribute to larger than necessary areas being burnt by wildfires. These fires cause economic and environmental losses and potentially threaten the lives of more people.** The key items are:

1. Lack of understanding that fire is a fundamental part of the Portuguese environment (c.f. Tedim et al, 2015)¹;
2. Legislation restricting effective operational practices in forest fire suppression, fuel management and prescribed burning;
3. Lack of ability for managers to define and agree on the objectives of land management on any given area;
4. Lack of strategic thought and accountability, at many levels, to the extent that it appears to be an embedded cultural attitude;
5. Systematic risk management not being adequately applied before, during and after forest fires;
6. Incorrect application of the Incident Management System at the national, sub-national and incident levels;
7. Limited learning by sharing of thoughts through adaptive management, debriefs, field tours, reviews, and seminars; and
8. The lack of nationally consistent standards of firefighter training, competency, and currency.

¹ Tedim, F., Xanthopoulos, G. & Leone, V. (2015) Forest Fires in Europe: Facts and Challenges, In: Chapter 5, pp.77-99, Wildfire Hazards, Risks and Disasters. DOI: 10.1016/B978-0-12-410434-1.00005-1. Elsevier Inc

Legislation

Observations:

The lack of understanding that fire is a fundamental part of the forest environment, and has been a natural part of the environment over many centuries, permeated from legislation through to the public with the perception that all fire is bad. It appears that, like many countries around the globe, Portugal's largely urban population is influencing forest policies, through ignorance of the practicalities of proper forest management, to the detriment of the forest environment.

Other observations were:

- Legislation / prescriptive rules, requiring reduction in tree density in fuel breaks, has the perverse outcome of increasing the fuel hazard. The requirement to thin conifer plantations to reduce stand density by 80% allows more sunlight into the stand and results in increased growth of shrubby (broom) vegetation which will only increase the fuel hazard - the opposite of the aim of the legislation. Management objectives for strategic fuel breaks should be to reduce the overall fuel hazard rather than specifically stipulating tree density – the tactical means by which the overall fuel hazard is reduced should be left to the responsible officers to determine. When planning and creating fuel breaks the long-term costs and ease of maintenance needs to be considered to ensure sustainability.
- Legislation permitting the splitting of land ownership to smaller and smaller parcels has created huge difficulties for Portugal in terms of economics and fire prevention measures.
- Legislation is unnecessarily restricting timber harvesting operations in hotter weather due to using the peak daily forecast wildfire risk rather than the risk being based upon actual wildfire risk at specific times of day and in specific locations.
- Legislation requiring Civil Protection Bombeiros, to be appointed as the Incident Commander, is leading to poor forest fire suppression outcomes. Incident Commanders should be the most appropriately trained and experienced person, regardless of organisation or rank and should have experience in managing large complex forest fires that move through the landscape.

Comments:

Legislation should promote strategic objectives not operational prescriptions. Responsible agencies must be left to determine the appropriate tactical prescription that is required to achieve the strategic objective on any given piece of forested land.

Other comments for consideration include:

- Legislation should set which entity/ entities have emergency response responsibilities for specific situations (urban fire, forest fire, animal health, human health, floods, extreme winds, car accidents etc.) It should be the Responsible Entity's role to determine who is best to command an incident. Incident Controllers must be selected by their relevant expertise, training and experience and not based on what shirt they wear or what position they hold.

- Consideration should be given for AGIF to select a person for a rotating two-year secondment as a Prime Minister’s Advisor, to help educate Ministers on forest fire matters and assist in the successful implementation and high-level awareness of the National Plan for Integrated Wildland Fire Management 2020-30.
- The development of an accurate, centralised land ownership database would assist in fire prevention.
- With respect to forest operations, legislation aimed at minimizing the probability of new wildfires being ignited needs to be tailored to the actual wildfire risk existing at the specific location of those forest operations. The intra-day changing levels of fire danger should also be considered when determining restrictions on forestry activities.

Land and Fuel Management

Observations:

While some lands are being burnt by the land managers and entities, there appeared little understanding of the strategic land management objectives to be achieved through conducting this prescribed burning.

Many planners could not explain, to the Vocational Training Team, what they were aiming to achieve for the land through their management actions, nor the intended level of wildfire risk reduction they were trying to achieve. They were unclear as to what the desired end state of the land would be with good fire management.

Silos between and within entities is preventing the successful, widespread transfer of knowledge and understanding to other scientists, field technicians, and managers. People were viewed by the VTT as working independently rather than operating in a collaborative manner, using adaptive management to achieve the vision as outlined in Portugal’s National Plan for Integrated Wildland Fire Management 2020-30. If ForestWISE was effectively performing its intended role, it would provide a good basis for effective fire science knowledge transfer and collaborative fire research and management.

Other observations were:

- The prescribed burning being undertaken is constrained by the adherence to the strict and restrictive current prescriptions. There is little understanding about the influence of the separate elements that combine to provide a successful outcome. Hence, the prescribed burning window is far more restrictive than necessary. Adherence to the strategic intent of the prescriptions, rather than the specifics in the prescriptions, would extend the burning period, and allow more suitable days to conduct prescribed burning.
- It appears that many people see all fire as being bad fire, regardless of its intensity, nor that some fires provide benefits whilst large, high intensity wildfires cause destruction.
- An incorrect general perception exists that wildfire risk is associated with vegetation type rather than the nature of the fuels. Wildfire risk should be associated with fuel management by managing the overall fuel hazard on specific strategic areas.

- There are many poorly managed forests across the landscape. This reduces their commercial value and increases their wildfire risk.

Comments:

Greater use of wildfire risk assessment and adaptive management with flexibility in the elements of the prescribed burning prescriptions (wind, relative humidity, temperature, and moisture content) would result in improved forest outcomes, reducing Greenhouse gas emissions through decreasing the overall smoke load and protecting human lives and the many values of the forest estate.

Other comments for consideration include:

- Education of ICNF staff and the public could help a shift in thinking to understand that fire is a natural and essential part of the Portuguese environment rather than just being a damaging process or a tool.
- There is an opportunity to greatly enhance the knowledge and experience of forest managers and researchers through the development of field-based research examining the effects of various fire treatments under a range of environmental conditions. These trials would be implemented by the local forest managers in collaboration with researchers to ensure scientific integrity. Such collaboration results in higher engagement between entities and opens up new channels for communication.
- ForestWISE could be a good vehicle to create the strong connections between the field personnel and the researchers, rather than just be a mechanism to fund forest and fire research. Jointly determining research priorities and collectively working on research utilisation would assist with full implementation of the National Plan for Integrated Wildland Fire Management.
- Understanding of forest fire needs to be included in the teachings at university and public education. Existing programmes should be supported and expanded.
- Well managed forests increase their resilience to fire and create more opportunities for fuel management (pre-fire season) and safer control opportunities for fire suppression.
- Fine fuels should be assessed using something similar to the Australian “Overall Fuel Hazard Guide” which specifically identifies elements of the fine fuel composition and structure that contribute to the overall fire hazards.² The current system of classifying vegetation types used in Portugal does not provide a sound basis for fuel assessment or management so the effects of fuel treatments can currently be unintentionally counterproductive.
- There is an opportunity to see better prevention measures undertaken by small landowners through the extension of the forest cooperative model, such as the Forest Association of Baixo Vouga and timber processing companies pursuing 100% Chain of Custody Forest Certification. Providing increased value to the asset creates a great incentive to the owner to protect their asset.
- Application of risk management in the strategic sense would help land managers identify the best locations in the landscape to use prescribed burning and reduce the level of wildfire risk. Such strategic positioning of prescribed burning treatments ensures the greatest benefit for the cost of management. Tools such

² [Report-47-Overall-Fuel-Hazard-Guide.pdf \(ffm.vic.gov.au\)](https://www.ffm.vic.gov.au/Report-47-Overall-Fuel-Hazard-Guide.pdf)

as Phoenix RapidFire³ are exceptionally useful in modelling fire across the landscape to determine where fuel management provides the greatest reduction in risk.

- National and sub-national risk management planning would assist in providing strong strategic direction for landscape-level fuel management, by prescribed burning and other preventative measures.
- Risk-based planning with scenario modelling may greatly assist the land managers understand the potential impacts of wildfire on forests and community values in locations such as Monsanto and the sand dunes of the Leiria National Forest. The managers of these forests need to understand that prescribed burning may be a strategic tool which will greatly reduce the impact of wildfires and create opportunities for fire control and achieving a range of other management objectives at the same time.
- Risk-based modelling would help bring together the multitude of factors that affect the level of wildfire risk. One good example is Monsanto in Lisboa where the heavy reliance on rapid initial suppression does not take full account of the possibility of multiple ignitions occurring due to projections of fire brands from areas of eucalypt trees which have the potential to overwhelm fire suppression resources on a hot windy day. Effective risk-based modelling should expose such examples where traditional methods of fire control are likely to fail and where other solutions are needed.
- Prescribed burning, operated within the structure of the Incident Management System, provides an excellent opportunity for personnel to gain forest fire experience in a range of environments, fuel types and weather conditions. This experience, in a closely managed environment, will enhance their fire management capabilities when under the more chaotic and demanding fire suppression operations.
- Prescribed burning provides an excellent training opportunity for all entities to work together under one Incident Command System (ICS).

Fire suppression

Observations:

All entities said that they are using Incident Command / Control System (ICS) but none demonstrated that they are using it in the same manner nor properly as detailed in the USA's National Incident Management System (NIMS)⁴. The VTT were advised that there are currently

³ Tolhurst KG, Shields B, Chong DMO. 2008. PHOENIX: development and application of a bushfire risk management tool. Australian Journal of Emergency Management. 23:47–54.

⁴ [Wildland Fire Training | US Forest Service \(usda.gov\)](#)

[Courses | National Advanced Fire & Resource Institute \(nafri.gov\)](#)

[Courses | National Advanced Fire & Resource Institute \(nafri.gov\)](#)

many unsafe fire suppression practices in Portugal resulting from this lack of implementation of a single common IMS.

Other observations were:

- There was no evidence of management by objectives, hence no strategic approach and poor communication between the decision makers and the operations staff in the field.
- Despite numerous requests by the VTT, we were never shown a written Incident Action Plan (IAP) which must be provided to field staff to give overall direction of resources. The lack of a well communicated IAP, leads to poor communication and understanding of strategies and tactics, inefficiencies, unnecessary expense, unsafe practices, and inevitable suppression failures.
- Appointment of Incident Commander / Incident Controller (IC) by legislation, based on the agency they work for, is flawed as the most experienced and accredited person is not placed in the role of IC.
- Sub-regional people had concerns that the national level exercised control rather than undertaking the appropriate role of national strategic co-ordination.
- There is concern that when Portugal has multiple major incidents that there will be no strategic allocation of resources nor coverage for new wildfires in high-risk areas.
- Many people advised the VTT that they wanted to use ICS correctly, however the system and cultural attitudes worked against them.
- It was reported that some ICs see knowledge as power and hence these ICs are reluctant to share knowledge with others in the Incident Management Team (IMT) and deliberately do not provide an IAP to all people on the fire ground.
- There is a danger where incidents cross municipal boundaries that the incident management will devolve into a series of incident management teams, operating independently, rather than all following the strategic directions of one Incident Commander.
- It was apparent that inappropriate intervention into the Incident Management Team, by the local government agencies (Mayor), was significantly detrimental to effective and efficient fire control. This was exacerbated when the incident crossed municipal boundaries.
- There was no evidence presented to demonstrate that the range of feasible fire suppression options had been considered formally and systematically to develop the fire control strategy.
- The fact that the Serra da Estrela IC placed a complete ban on burning-out operations demonstrates a number of issues:
 - The system of control with all teams working together towards a common objective was ineffective and not in place. It was reported to the VTT that, once authorization to undertake burning was granted for one section of the fire, numerous other teams / individuals took that as authorization that they too could conduct burning operations (Contra and Tactical fire).
 - Burning-out is a skilled operation and requires people who are highly trained and skilled in its implementation
 - Fear of failure; one bad experience should not preclude that option for future strategies.

- IC acted as a *Sector Commander* or *Operations Officer* rather than managing the Incident Management Team.
- Fireline's on the Serra de Estrela fire constructed by machinery were not constructed in the most appropriate place to suppress the wildfire nor minimise soil erosion post wildfire. Well placed control lines will:
 - Enable swift suppression control;
 - Be accessible to enable good black-out (mop-up) which reduces the chance of re-kindling (VTT were advised that 1 in 7 fires suffer re-kindling.); and
 - Reduce active erosion and enable good burn area rehabilitation.
- Tactical burning is not always used to remove unburnt fuel between the constructed fireline and the burning edge of the fire, resulting in a greater risk of re-kindling.
- Rehabilitation of firelines is not being undertaken before resources are released from a wildfire which results in major soil erosion.
- Bombeiros are not volunteers but paid firefighters on a retention system so should act professionally.
- Bombeiros in ANEPC and GNR are well located for initial attack.
- The Afocelca and the Navigator staff appeared to be well trained in forest fire management but were restricted in their opportunities to use their knowledge in fire prevention and suppression.
- Industry (Afocelca) advised that they had to develop their own Fire Behaviour Analyst capacity as they do not receive any fire spread information from ANEPC.

Comments:

Australia changed to an "all-hazards" approach for Incident Management and failed. Experience has shown that the IC should be the best person who has had the right level of experience and accreditation in the field of the Incident being tackled (wildfire in forests, urban fire, floods, human health, animal health, extreme winds, car accidents, etc). The most successful approach is for the IC to have expertise in the area being addressed regardless of their position within an entity – without this relevant expertise the IC does not know the right questions that need to be asked.

Other comments for consideration include:

- Portugal would benefit from the full adoption of the USA's NIMS including the training for each lead IMT role.
- ANEPC officers may not be the most appropriate, suitably qualified and experienced officers to perform extended attack in forest fires. This was demonstrated in recent wildfire events by not acting in a strategic manner to ensure that the forest wildfires were suppressed in the most efficient, effective, and safe manner.
- Rehabilitation of fire control lines needs to be considered part of the suppression operation. Commencing rehabilitation whilst the suppression machines are on site will lead to efficient and effective use of machines, cost reductions and vastly improved soil and water protection outcomes.
- If the objective of proper land management is to be achieved, fire suppression lines, constructed by hand or machinery, should include erosion control measures before the fire resources are released. They should be constructed using well

trained and experienced fire line operators and be strategically planned and implemented to minimise future environmental issues.

- Incident Action Plans (including details of the strategy, objectives and maps) should be provided to all the IMT and all field staff at least down to the Crew Leader level.
- Burnt Area Emergency Response teams should be engaged as soon as the forest wildfire moves into extended attack and their rehabilitation works should begin as soon as possible (conducive to restricting the wildfire spread) and before resources are released from the fire area.
- IAP's should follow the SMEACS structure (Situation, Mission, Execution, Administration, Command and Communication, Safety) and all crews must be briefed at the beginning of each shift based on the IAP and the SMEACS structure.
- Introducing a system of debriefing at the end of every shift would improve firefighter safety and effectiveness of fire control operations by providing relevant information to the IMT to feed into the next IAP.
- There may be benefit in identifying which existing entity, or a new entity, should be responsible for national resource coordination and allocation to cover the daily wildfire risk, wildfire statistics, etc on a strategic level across the whole of Portugal.
- AGIF should consider engaging an independent analysis of all major incidents with the intention of developing a continuous improvement culture within forest fire management.



Appendix 1:

Rotary Foundation Global Grant for community economic development (GG2099432)

Overview

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, for prescribed burning experience in Australia.

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.

This Vocational Training is aimed at improving Portugal's community economic development in the following areas:

- Empowering communities to develop environmental and natural resource conservation skills for economic gain;
- Strengthening communities' economic resilience and adaptive capacity in response to environmental and climate-related hazards and natural disasters; and
- Developing and supporting community-based basic emergency preparedness services to improve economic resilience.

Background

Across the entire rural landscape of Portugal there exists a community at risk from forest fires. This is mainly due to the huge tracts of land planted with introduced Australian native trees. Hence, the beneficiaries from this VTT's training and mentoring shall include all forest firefighters and all rural communities in Portugal.

After a major inquiry into the devastating 2017 bushfires which claimed 112 lives, Portugal made a significant change in its fire management policy from a focus on fire suppression to a primary focus on improved land management to reduce fire risk. It is in this area of forest fire management that the newly created Portuguese agency, the Agency for Integrated Management of Rural Fire (AGIF), sought Australia's assistance.

AGIF sought assistance to help the following Portuguese entities:

- National Emergency and Civil Protection Authority - ANEPC
- Institute for Nature and Forest Conservation - ICNF
- Republican National Guard - GNR
- Armed Forces (Air Force) - FFAA
- National School of Firefighters - ENB
- Associations of Forestry Producers
- Collaborative Laboratory for Integrated Forest and Fire Management - FORESTWISE
- Complementary Grouping of Companies - AFOCELCA
- Centro PINUS association
- Forestry Association of Portugal – FORESTIS
- Polytechnic of Lisbon
- Collaborative Laboratory

Application drafted in early 2019 with support from Rotary's Past District Governor – 2018/19 (District 1960), Ilda Braz; District Coordinator for Global Grant, Rotary Foundation, Alberto Esteves Guerra; Chairman of the AGIF Board of Directors, Tiago Martins De Oliveira; Rotary's Past District Governor- 2019/20(District 9780), Rosanne Kava; Past President of the Rotary Club of Ballarat South – 2018/19, Paul Barrett; and Past President of the Rotary Club of Ballarat South – 2021/22, Gary Morgan.

Implementation

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.

The delay also meant that not all proposed VTT members were available for participation. Nevertheless, a highly qualified team was formed providing around 150 years of combined forest fire management expertise. (Their summary experiences are attached).

Wet weather also hampered the lighting of prescribed burns. However, this did not prevent active discussions on the planning and execution of prescribed burning at several different sites, between the Portuguese and the Australians; and between the Portuguese from various entities.

AGIF's João Pedro Quadrado escorted the VTT around Portugal and not only provided interpretation when required but effectively adjusted the VTT program to suit the weather, and the availability of unscheduled additional people, for the VTT to interact from various organisations. His role was invaluable to the success of the VTT.

Appendix 2: Australian Vocational Training Team 2022

Rotary  **GG 2099432**
Eucalypt Forest Fire Management
Vocational Training Team members

- Ruth Ryan AFSM 
- Dr Kevin Tolhurst AM 
- Neil Cooper PSM 
- Gary Morgan AM ASFM (Team Leader) 



Rotary  **GG 2099432**
Eucalypt Forest Fire Management
Vocational Training Team members

Ruth Ryan AFSM

- Corporate Fire Manager for commercial forestry company, HVP Plantations
- Registered Forestry Professional
 - Fire Management
 - Commercial timber plantations
- Commenced work 1983 Ash Wednesday Bushfires
 - Cann River 250,000 hectares
- First female accredited as a Level 3 Operations Officer in Victoria
- Extensive experience:
 - High intensity slash burning
 - Fuel reduction burning
 - Operational fire control



Rotary



GG 2099432

Eucalypt Forest Fire Management Vocational Training Team members

Dr Kevin Tolhurst AM

- **Honorary Senior Fellow** (Associate Professor) of the University of Melbourne's School of Ecosystem and Forest Sciences with 46 years forest fire management and fire research.
- **Forest Assessment** (aerial photo interpretation, field surveys, timber assessment)
- **Vegetation Surveys** (plant identification, field surveys, aerial photo interpretation)
- **Forest fire fighting** (crew leader, communications officer, fire behaviour and weather technical specialist)
- **Teaching** (Natural Resource Management technical training, undergraduate degree – botany, taxonomy, dendrology, ecology, fire management, landscape ecology, post-graduate supervision, fire behaviour analyst)
- **Research** (Effect of timber harvesting on plant floristics and structure; effect of repeated fire on forest soils, plants, tree growth, invertebrates, mammals, reptiles, birds, fuels; bushfire simulation and risk analysis) writing 223 scientific papers and reports.
- **Developed a bushfire risk and spread simulator, PHOENIX RapidFire**, which has been adopted in Queensland, NSW, Victoria, South Australia and Tasmania.
- **Extension** (Presentations, discussions and field-days with community groups, land and fire management agencies, politicians, various professional bodies, public and internal inquiries/reviews)

Rotary



GG 2099432

Eucalypt Forest Fire Management Vocational Training Team members

Neil Cooper PSM

- Program Manager for CSIRO's National Bushfire Intelligence Capability project bringing uniformity in bushfire risk and intensity mapping across all Australia Jurisdictions.
- 40 years experience in forestry and forest fire management
- Previously:
 - Responsible for Forest fire in the Australian Capital Territory
 - Director on the Board of the Australasian Fire and Emergency Service Authorities Council (AFAC) for over 10 years;
 - Chair of the Australian/ NZ Forest Fire Management Group (FFMG) for 12 years , and
 - ACT Representative on the Australian Forestry and Forest Products Committee, for 20 years.
 - Incident Controller Level 3 for major wildfires in 1991, 2001 , 2003 and 2020.
- Senior Incident Management roles when deployed to wildfires in the US and Canada multiple times.
- Undertaken major fire reviews in NZ and Queensland.

Rotary



GG 2099432

Eucalypt Forest Fire Management Vocational Training Team members

- **Gary Morgan AM AFSM**
- Immediate Past Present of the Rotary Club of Ballarat South.
- Principal Consultant, Global Wildland Fire Management Services.
- Previously:
 - 32 years of forestry and fire management experience
 - Chief Fire Officer for 9 years.
 - CEO Bushfire Cooperative Research Centre for 7 years.
 - Arranged the first deployment of Australians and New Zealanders to the USA in 2000.
 - Chair of International Liaison Committee for the 3rd International Wildland Fire Conference and Summit, 2003. Continued supporting IWFCs in Spain, South Africa, South Korea and Brazil.

Appendix 3: Portugal Vocational Training Team 2023

Stage two of the Rotary Foundation's Global Grant provides funding for a team from Portugal to attend the Bushfire Centre of Excellence at Nambelup, south of Perth, Western Australia. At this location they will receive training in the planning and operational aspects of prescribed burning for pine and eucalypt forests. This will be in accord with the USA's NIMS. The dates are to be finalised but most likely shall be in April, post Easter, 2023.

It is expected that given the delay in implementation of this Global Grant, due to Covid-19 travel restrictions, that there may be some changes to the original people selected in the Grant application who shall now participate in Australia. Hence, to provide some guidance for Tiago Oliveira and Ilda Braz when finalizing their team and with the aim of providing the greatest benefits for the implementation of the National Plan for Integrated Wildland Fire Management 2020-30, it is suggested that the following criteria may be considered:

- Mid-career people with a long-term prospect of being influential Champions of an improved prescribed burning approach for Portugal's forest estate;
- People who are prepared to undertake pre-course prerequisites;
- People who willing follow a team approach and the principles of ICS; and
- Commit to writing a combined team report on conclusion of their time in Australia.

Funding allows for five people to attend Australia for 18 days. This period will not only train and provide experiences but it will also help bring the Portuguese into a strong supportive team. Hence, it is suggested, that to help integrate the Entities, that the prospective mix of Champions are selected from ICNF, GNR, ANEPC and AGIF.

It is also expected that the Portuguese team's combined report on their experiences and what they learnt shall be submitted to Ilda Braz, Tiago Oliveira and Gary Morgan.

Appendix 4: Vocational Training Team 2022 Work Plan

Name of the Project - Eucalypt Forest Fire Management Vocational Training Team - Build skills within a community by supporting a team of professionals that will travel abroad to train or learn from colleagues in the community they visit.

Length – 21 days, including travelling time, weekends and holidays.

Dates - 6th November to 25th November, 2022.

Objectives:

The main objective of this VTT is the provision of forest fire management skills vocational training in prescribed burning for wildfire mitigation, wildfire preparedness and predictive services, wildfire incident management, and guidance in establishing collaborative wildfire research, across multiple organizations and disciplines.

Across the entire rural landscape of Portugal there exists a community risk from forest fires. This is mainly due to the huge tracts of land planted with introduced Australian native Eucalyptus trees. Hence, the beneficiaries from this VTT's training and mentoring shall include all forest firefighters and all rural communities in Portugal. However, even city residents in Portugal will gain from the nation's reduction in economic and environmental losses.

The main areas of training are:

- Fire behaviour analysis/predictive services;
- Prescribed fire, burnout and backfire (planning, execution and evaluation);
- Incident command management;
- Incident tactical aerial coordination;
- Dozer Operations.

Expected results

Empowering communities to develop environmental and natural resource conservation skills for economic gain; Strengthening communities' economic resilience and adaptive capacity in response to environmental and climate-related hazards and natural disasters; Developing and supporting community-based basic emergency preparedness services to improve economic resilience.

VTT Team Members

Name	Email	Team Leader
Mr. Gary Morgan AM AFSM	gary.morgan.aust@gmail.com	Yes
Dr. Kevin Tolhurst AM	kgt@unimelb.edu.au	
Ms. Ruth Ryan AFSM	ruthryan@westnet.com.au	
Mr. Neil Cooper PSM	Neil.cooper@inverary.com.au	
AGIF Liaison / Transport João Quadrado	joao.quadrado@agif.pt	

Program overview

Day	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Overnight	Lisboa		Lousã/Coimbra										Castelo Branco			Lisboa				
Venue			PCM	ESAC	COTF				Campo ICNF		COTF	SE			Campo Afocelca				PCM	
Rotary						Dinner							Dinner						Meeting	

6NOV to 7 NOV		SUN to MON	Arrival to Lisboa		
6	Morning	12:00 Arrival Emirates EK191		Tiago Oliveira	Tiago Oliveira
	Afternoon	Transfer to hotel			
Overnight	Lisboa VIP Executive Zurich. Rua Ivone Silva, 18-1050-1240. Lisboa, Portugal				
7	Morning	Free time for travel adjustment.			
	Afternoon				
Overnight	Lisboa VIP Executive Zurich. Rua Ivone Silva, 18-1050-1240. Lisboa, Portugal				

8NOV		MON to TUE		Contact with other entities in the program @ Edifício Caixa Geral de Depósitos, Av. João XXI, Lisboa	
8	Morning	08:30 Transfer to meeting venue with driver 09:00 – 11:00 Meeting with AGIF Board <i>Brief talk about the main goals of the program, expectations, and schedule. General description of the system and inputs expected.</i>	João Quadrado	Claudio Caldas	
	Afternoon	15:00 – 17:00 Meeting with the SGIFR organizations and other main players at national level. <ul style="list-style-type: none"> • ICNF (forests and conservation institute) • ANEPC (civil protection) • GNR (national guard) • Navigator, Altri, Sonae Arauco (main pulp producers) • Forestis, Baladi (main owners' organizations) <i>Suggested to be a short presentation followed by a discussion about program goals and connection with the Portuguese reality.</i>			
Overnight	Lisboa	VIP Executive Zurique. Rua Ivone Silva, 18-1050-1240. Lisboa, Portugal			

9NOV		WED		Combined team presentation with Richard Adler – Short seminar – How the Australian Experience could contribute to SGIFR (Portuguese system) @ ISA (university)	
9	Morning	08:30 Pick up and travel 9:00 – 11:00 Travel to Coimbra	Contact point	Driver	
	Afternoon	15:00 – 17:00 Short seminar – How the Australian Experience could contribute to SGIFR <i>The main idea is to have a set of short PPT presentations (around 15 minutes each) about each area of expertise. We asked the same to Richard. In the end we will have a round of quick questions. The target audience will be strategic level of SGIFR entities and academic community</i> Media contact	João Quadrado	João Quadrado	
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal			

10NOV		THU		Meeting with main research centres, regional level of ICNF and local politicians. @COTF - Lousã	
10	Morning	09:00 Transfer to meeting venue with driver 10:00 – 12:00 Meeting with main research centres: ForestWise <i>Suggested talk with Portuguese centres and how Australian experience could benefit them to transfer knowledge from academia to technicians</i>	Contact point	Driver	
	Afternoon	15:00 – 16:30 Overview of pinaster areas in sand soil. Meeting with local level of ICNF and plan prescribed burn for the coming week. <i>Suggested framework talk with local politicians, what's expected from the new system.</i>	João Quadrado	João Quadrado	
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal			

11NOV		FRI			Microcredentials @ COTF - Lousã	
11	Morning	09:30 Transfer to meeting venue with driver 10:00 – 17:00 Meeting with António Salgueiro (AGIF) <ul style="list-style-type: none"> • Centro Pinus <i>Suggested talk with Portuguese centres and how Australian experience could benefit them to transfer knowledge from academia to technicians</i> <i>Microcredentials</i> 20:00 – Dinner with Rotary club members	Contact point	Driver		
	Afternoon		João Quadrado	João Quadrado		
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal				

12NOV to 13NOV		SAT to SUN			Free weekend	
12	Morning	Free time – report writing	Contact point	Driver		
	Afternoon					
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal				
13	Morning	Free time- report writing				
	Afternoon					
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal				

14NOV to 16NOV		MON to WED		Field work with ICNF regional teams	
14	Morning	08:30 Transfer to meeting venue with driver 09:00 – 17:00 – Field work with regional teams of ICNF <i>Depending on weather, could be prescribed burning mentoring (preferably pinaster on sand areas), field visits with operational planning or as backup, presentation regarding prescribed burning and/or dozer operations. Participation of technicians from forest production, nature conservation and fire management.</i>	Contact point	Driver	
	Afternoon		João Quadrado	João Quadrado	
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal			

15	Morning	08:30 Transfer to meeting venue with driver 09:00 – 17:00 – Field work with regional teams of ICNF <i>Depending on weather, could be prescribed burning mentoring (preferably pinaster on sand areas), field visits with operational planning or as backup, presentation regarding prescribed burning and/or dozer operations. Participation of technicians from forest production, nature conservation and fire management.</i>	João Quadrado	João Quadrado
	Afternoon			
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal		

16	Morning	08:30 Transfer to meeting venue with driver 09:00 – 17:00 – Field work with regional teams of ICNF <i>Depending on weather, could be prescribed burning mentoring (preferably pinaster on sand areas), field visits with operational planning or as backup, presentation regarding prescribed burning and/or dozer operations. Participation of technicians from forest production, nature conservation and fire management.</i>		
	Afternoon			
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal		

17NOV	THU	Meeting with AGIF regional team, first feedback		
17	Morning	09:30 Transfer to meeting venue with driver 10:00 – 12:00 Technical Seminar at ESAC 14:00 – 18:00 Participation at 9th International Forest Fire research Conference	Contact point	Driver
	Afternoon		João Quadrado	João Quadrado
Overnight	Coimbra	Aeminium Coimbra Hotel (Ex Tryp Coimbra) Av Armando Goncalves 20-3000-0590, Coimbra, Portugal		

18NOV	FRI	Serra da Estrela Wildfire – Field visit		
18	Morning	08:30 Pick up and traveling 8:30 – 10:00 Travel to Serra da Estrela	Contact point	Driver
			João Quadrado	João Quadrado

	Afternoon	10:00 – 10:30 Visit to ICNF machinery headquarters. Meeting with team. <i>Framework visit of the Portuguese reality</i> 14:00 – 16:00 Overview of the Serra da Estrela wildfire <i>Largest fire 2022, framework visit.</i> <i>Expected contributions from a lessons learned perspective.</i> 16:30 – 17:30 Travel to Castelo Branco		
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Overnight Castelo Branco: Melia Castelo Branco Rua Da Piscina – 6000-4530, Castelo Branco, Portugal

19NOV to 20NOV	SAT to SUN	Free weekend		
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19	Morning	Free time – report writing	Contact point	Driver
	Afternoon			

Overnight Castelo Branco

20	Morning	Free time- report writing		
	Afternoon			

Overnight Castelo Branco: Melia Castelo Branco Rua Da Piscina – 6000-4530, Castelo Branco, Portugal

21NOV to 22NOV	MON to TUE	Field work with AFOCELCA		
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21	Morning	08:30 Transfer to meeting venue with driver 09:00 – 17:00 – Field work with regional teams of AFOCELCA <i>Depending on weather, could be prescribed burning mentoring (eucalyptus), field visits for operational planning of burns or as backup, presentation regarding prescribed burning and/or dozer operations.</i>	Contact point	Driver
	Afternoon		João Quadrado	João Quadrado

Overnight Castelo Branco: Melia Castelo Branco Rua Da Piscina – 6000-4530, Castelo Branco, Portugal

22	Morning	09:00 Pick up and traveling 09:00 – 11:30 Travel to Lisbon	João Quadrado	João Quadrado
	Afternoon			

Overnight Lisboa: Lutecia Smart Desing Hotel Avenida Frei Miguel Contreiras, 52 – 1749-086 Campo Pequeno, Lisboa, Portugal

23NOV	WED	Travel/free time		
23	Morning	09:00 Pick up and traveling 09:00 – 12:00 National Firefighting school 12:30 – 14:00 Lunch with AGIF board	Contact point	Driver
	Afternoon		14:00 – 16:00 Visit to Parque Monsanto 16:00 – 18:00 Presentation – team of researchers	João Quadrado

Overnight Lisboa: Lutecia Smart Desing Hotel Avenida Frei Miguel Contreiras, 52 – 1749-086 Campo Pequeno, Lisboa, Portugal

24NOV	THU	Reporting and feedback with AGIF board @ Edifício Caixa Geral de Depósitos, Av. João XXI, Lisboa		
24	Morning	09:30 - Meeting with AGIF Board 11:00 – 12:00 Media Interview with “Publico” 12:00 – 15:00 Final lunch with entities and presentation of first results	Contact point	Driver
	Afternoon		15:00 – 17:00 Visit to National Command Centre of ANEPC 17:00 – 18:00 meeting with panel of experts evaluating wildfires 2022	Sara Miei

Overnight Lisboa: Lutecia Smart Desing Hotel Avenida Frei Miguel Contreiras, 52 – 1749-086 Campo Pequeno, Lisboa, Portugal

25NOV		FRI Departure		
25	Morning	Free time	Contact point	Driver
		Afternoon	20:45 Depart Emirates EK 194	
2023 March 3	Morning	08:30 Teams meeting Australia and Lisboa	Joao Quadrado	
2023 April 29	Morning	06:30 Teams meeting Australia with Lisboa	João Quadrado	

Target Audience

Individuals from the different organizations of the Integrated Rural Fire Management System (SGIFR) that perform strategic and tactical functions for rural fire management and protection against rural fires.

Preferred profiles of participants:

Civil protection authority (ANEPC)

- Regional and Sub-regional Commanders of the Operational Structure
- Fire Brigade Commanders

National Guard (GNR)

- Company Commander
- CMA Commander

Armed forces (Air force)

- Pilots and officers with functions in firefighting with aerial means

Forest and nature conservation Institute (ICNF)

- Rural fire managers
- Production managers
- Wildlife/conservation managers

Forest owner's association (Forestis)

- Forest managers

AFOCELCA

- Regional Coordinators

Equipment – laptop, mobile, PPE

Local crew mobile phones:

Office - + 351 21 303 50 60

Driver - Cláudio – + 351 91 980 40 59

Technical contact – João Quadrado –
+351 969 785 087

AGIF's Board

Tiago Oliveira + 351 96 250 68 42

Mário Monteiro - + 351 96 514 74 65

Paulo Mateus - + 351 96 508 23 74

Regional units

Bruno Antunes: +351 969 785 090

Rui Xavier: +351 969 785 110

Helga Soares: +351 96 97 85 109

Pedro Curto: +351 969 785 104

Media

Sara Mieirol: +351 969 780 481

Emergency service – 112

Appendix 5: People with whom the 2022 VTT interacted with to formulate observations.

Date	Name	Organisation
8 November 2022	Tiago Oliveira	AGIF, President Board of Directors
	Mario Monteiro	AGIF, Board Director
	João Verde	AGIF, Deputy of Board
	João Pedro Quadrado	AGIF, Regional expert
	Pedro Nunes	ANEPC, Deputy Commander
	Nuno Sequeira	ICNF, Board of Directors
	João Pinho	ICNF, National Director -Rural fire management
	Nuno Calado	Sonae Arauco
	Sergio Gomes	Afocelca
	Carlos Trindade	Municipality of Mafra
	Rui Cunha	Quercus
	José Rodrigues	GNR, Colonel
9 November 2022	Paulo Mateus	AGIF, Board Director
	Arlindo Santos	AGIF, Deputy of Board
	Rui Xavier	AGIF, Regional Director
	Yannick LaPage	AGIF, expert for technologies and innovation
	Pedro Venâncio	AGIF, expert for technologies and innovation
	Nelson Ferreira	AGIF, expert for lessons learned
10 November 2022	Luis Pita	ICNF Sub Regional Manager of rural fire (Coimbra)
	Rui Giestas	ICNF Sub Regional Manager of rural fire (Leiria)
	Rita	Production Manager of Mata Nacional de Leiria
	Filipe Cuim	Força de Sapadores Bombeiros Florestais (Forest firefighters)
	Carlos Fonseca	ForestWise, CTO
	Arlindo Santos	AGIF, Deputy of Board
11 November 2022	Susana Carneiro	Centro PINUS
	José Gaspar	IPC (Politechnical School of Coimbra), Vice President
	Vitor M. Nobre Cordeiro	District Governor Rotary District 1960
	Ilda Braz	President of the Board of Directors, Rotary Foundation
	Alberto Esteves Guerra	Curador na Fundação Rotária Portuguesa

Date	Name	Organisation
	João Quadrado	AGIF, regional expert
	Many on-line and in theatre.	More than 100 persons
14 November 2022	Antonio Salgueiro	AGIF, deputy of the board
	Pedro Venâncio	AGIF, expert for technologies and innovation
	Yannick Le Page	AGIF, expert for technologies and innovation
	Nelson Miguel Gonçalves Ferreira	AGIF, expert for lessons learned
	Domingos Brito	AGIF, expert for financial area
	Luis Sarabando	APFVB
15 November 2022	Elmano Silva	ICNF, Deputy Regional Manager
	Joana Carinhas	ICNF, Sub-regional coordinator for fire management
	Luís Pita	ICNF, Sub-regional coordinator for fire management
	Rui Giestas	ICNF, Sub-regional coordinator for fire management
	Hugo Rocha	ICNF, Sub-regional coordinator for fire management
	Vitor Caramelo	ICNF, Sub-regional coordinator for fire management
16 November 2022	Rui Ventura	ICNF, Team of experts for fire management:
	José Proença	ICNF, Team of experts for fire management:
	Daniel Santana	ICNF, Team of experts for fire management:
	Paulo Albino	ICNF, Team of experts for fire management:
	Rui Lopes	ICNF, Team of experts for fire management:
	Pedro Amaral	ICNF, Team of experts for fire management:
	José Lopes	ICNF, Team of experts for fire management:
	José Rodrigues	ICNF, Team of experts for fire management:
	Américo Pereira	GNR
17 November 2022	Prof. Domingos Xavier	8 th International Forest Fire Research Conference
18 November 2022	People already listed	Serra de Estrela
	President Rui Camelo	Rotary Club de Castelo Branco
	Secretary João Meruje	Rotary Club de Castelo Branco

Date	Name	Organisation
	Commander Francisco Peraboa	ANEPC
	Jose Mocito	Municipality of Castelo Branco
	Adriano Martins	Municipality of Castelo Branco
21 November 2022	João Bandeira	Navigator
	Luís Alarico	Navigator
	Luiz Muñoz	RAIZ
	Sergio Maggiolli	AFOCELCA
	Jorge Picão	AFOCELCA
	José Silva	AFOCELCA
	Leonel Silva	AFOCELCA
23 November 2022	Duarte da Costa	ANEPC, president
	Nuno Miguel Soares Banza	INCF, President of the board
	Vitor Reis	President of the board ENB
	José Lopes	Board member ENB
	Marco Martins	Board member ENB
24 November 2022	Tiago Oliveira	AGIF President Board of Directors
	Mário Monteiro	AGIF, Board of Directors
	Joao Pedro Quadrado	AGIF, Regional expert
	Jorge Goulão	GNR, Unit Commander UEPS
	Vitor Lima	GNR, 2º Unit Commander UEPS
	Major-General Tiago Vasconcelos	Prime-Minister cabinet
	Carlos Fonseca	ForestWise, CTO
	Nobre de Sousa	Chefe do Estado Maior do CCOM
	Madame Jess Healey	Australian Char-gés d'affaires to Portugal Embaixada da Austrália em Lisboa
	Orlando Mascarenhas	PJ
	Sara Pereira	CELPA
	Eduardo Simões	ISCTE, President
	Eduardo Correia	LBP
	Nuno Calado	SONAE
	André Fernandes	ANEPC, National Commander
	Adjunto Alexandre Pena	ANEPC, Deputy Commander
	Chefe de Célula Carlos Mota	ANEPC, Cell Coordinator
	Dr. Carlos Albuquerque,	ICNF, Diretor do Departamento de Conservação da Natureza e Biodiversidade
	Dr. Mário Reis	ICNF, Chefe da Divisão de Conservação e Monitorização
	Dr. Jorge Humberto Dias	ICNF, Chefe da Divisão de Gestão do Programa de Fogos Rurais
	Past District Governor Ilda Braz - 2018/19	District Coordinator for Polio Plus, Rotary Foundation

Date	Name	Organisation
	Alberto Esteves Guerra	District Coordinator for Global Grant, Rotary Foundation
	Past President Pedro Melo- 2018/19	Rotary Club of Ponta Delgada, S. Miguel (Acores)
	Indicated Governor Paulo Taveira de Sousa	Rotary Club of Lisboa Estrela
	Prof. Cristina Máguas	Coordenadora da Comissão Executiva cE3c - Centre for Ecology, Evolution and Environmental Changes & CHANGE - Global Change and Sustainability Institute
	Prof. Domingos Xavier	University of Coimbra and Chairman of the 9 th International Conference on Forest Fire Research, Coimbra, Portugal.
	Prof. Carlos da Camara	University of Lisboa
	Prof. Jan Keizer	University of Aveiro
	Prof. Herminio Sousa	University of Lisboa
	Prof. Joao Castro Gomes	Universidade da Beira Interior
	Prof. Joaquim San de Silva	Instituto Politécnico de Coimbra
	Prof. Teresa Pinto-Correia	Universidade de Évora
29 April 2023	André Fernandes	ANEPC, National Commander
	Miguel Cruz	ANEPC, 2 ^o National Commander
	Carlos Carvalho	ANEPC, Chief of Department of Planning, Doctrine, and Training



Appendix 6: Photos with some of the people with whom the 2022 VTT interacted with to formulate observations.



AGIF Board of Directors. Lisboa. Portugal



Integrated Rural Fire Management System (SGIFR) organizations and other main players at national level.



Rotarians from the Rotary Club of Coimbra.



Politechnical School of Coimbra: VTT with José Gaspar and Antonio Salgueiro



Politechnical School of Coimbra. Portugal.

Rotary Club de Castelo Branco

<http://www.rotary-cb.org/>

O nosso clube promoveu um encontro com um grupo de 4 elementos, vindos da Austrália e que participa no projeto "Eucalyptus Forest Fire Management Vocational Training Team", promovido pela AGIF – Agência para a Gestão Integrada de Fogos Rurais, I.P., em parceria com o Rotary Club de Ponta Delgada.

O seu team leader é Gary Morgan do Rotary Club de Ballarat.

O encontro teve a presença do Comandante Operacional Distrital de Castelo Branco, Francisco Peraboa e de 2 elementos da empresa ALTRI, ligada à produção de pasta de celulose e gestão florestal.

Foi assim possível trocaram-se experiências na área dos fogos florestais o que muito motivou a participação de todos neste encontro.





ICNF staff, Beira Litoral, Portugal.



ICNF Fire Experts, Training Centre, Louisa, Portugal.



VTT with Prof. Domingos Xavier, Forest Fire Research Laboratory (LEIF). Lousa, Portugal.



Beira Litoral, Portugal.



Beira Litoral, Portugal.



Penamacor, Portugal.



IXth International Conference on Forest Fire Research, Coimbra, Portugal.



 Meta: Imprensa
 País: Portugal
 Período: Diária
 Âmbito: Informação Geral
 Pág: 12
 Cor: Cor
 Área: 25,70 x 31,00 cm²
 Corte: 1 de 3

ID: 102444971 29-11-2022

Sociedade Incêndios florestais

Comando mais qualificado nos fogos permitia “poupar vidas já em 2023”

Quatro peritos australianos em fogos estiveram três semanas em Portugal a analisar o nosso sistema de combate a



Article regarding the VTT in the Lisboa newspaper. Translated version follows:

Command more qualified in fireworks would allow “save lives as early as 2023”

Four Australian fire experts spent three weeks in Portugal review our combat system fires and suggests several changes.

Four Australian bushfire experts spent three weeks in Portugal to know and analyze our forest fire fighting system and suggest several changes, some at no cost and with almost immediate effect. A new organization of combat operations forest fires, essentially restricting the command of great fires to persons with the qualification and the necessary experience, it would be enough to improve the shape substantial numbers of burned area and of lives lost due to this problem.

This is the conviction of four specialists Australians in bushfires that raged for three weeks in Portugal as part of a project part of the exchange program of the Management Agency Integrada dos Fogos Rural (AGIF) which was funded by the Rotary foundation International.

Appendix 7: Map indicating main areas visited by the 2022 VTT. ■

