Victorian Response Plan for Heat Stress in Flying Foxes

VICTORIA State Government | Energy, Environment and Climate Action

Acknowledgements

Friends of Bats and Bushcare, Wildlife Victoria, Zoos Victoria, Parks Victoria, City of Greater Geelong, Warrnambool City Council, RSPCA Victoria, International Fund for Animal Welfare

Photo credit

All images courtesy of Doug Gimesy

Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.

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Accessibility

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Contents

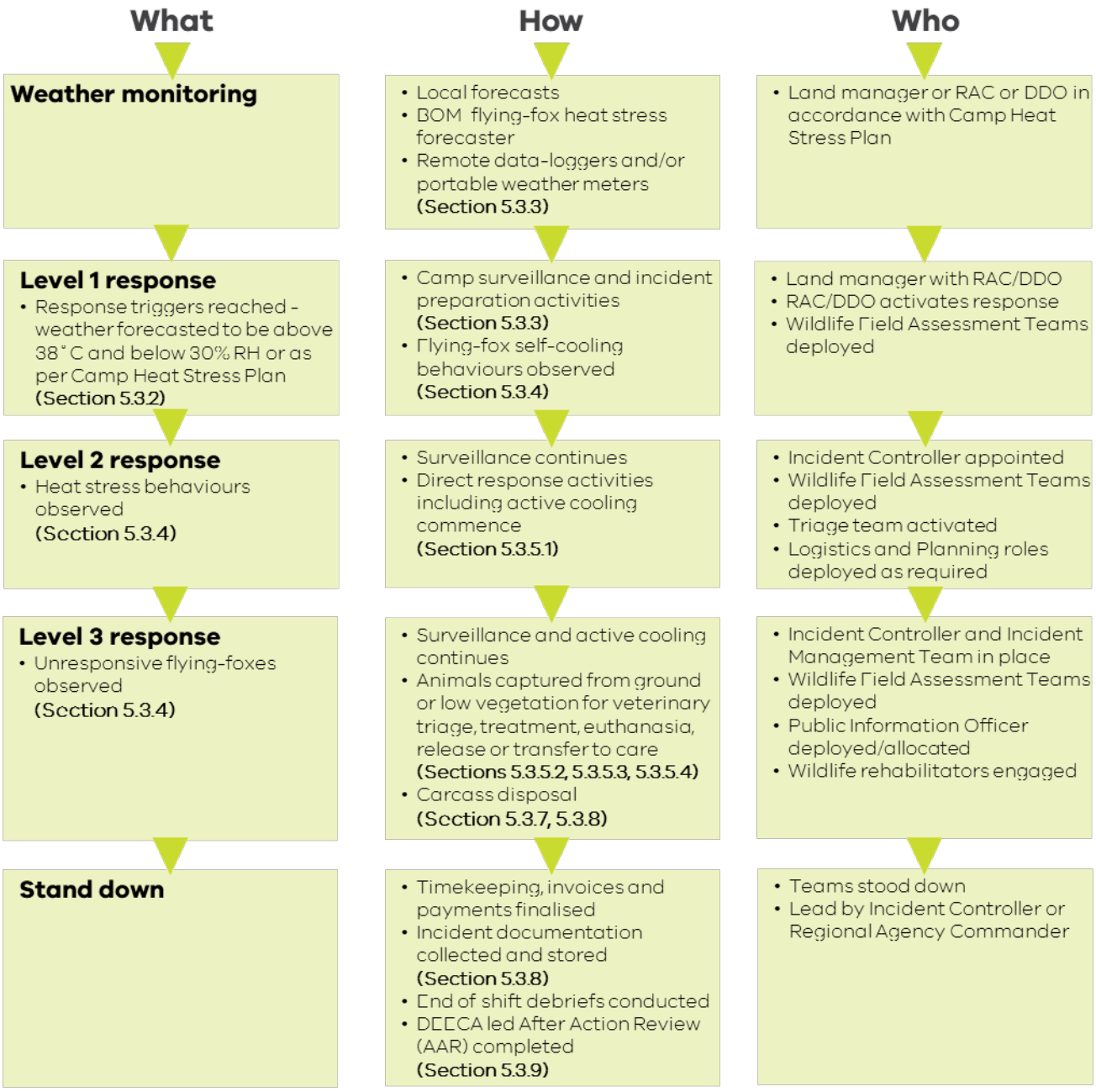
List of Figures

List of Tables

Acronyms

AAR	After Action Review
ABLV	Australian Bat Lyssavirus
AIIMS	Australasian Inter-service Incident Management System
AVA	Australian Veterinary Association
BAU	Business as Usual
CFA	Country Fire Authority
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAWE	Department of Agriculture, Water and the Environment
DEECA	Department of Energy, Environment and Climate Action
DDO	District Duty Officer
EAP	Employee Assistance Program
EMC	Emergency Management Commissioner
EPA	Environment Protection Authority
FFMV	Forest Fire Management Victoria
FRV	Fire Rescue Victoria
GHFF	Grey Headed Flying-fox
GPS	Global Positioning System
HDCV	Human diploid cell vaccine
IAP	Incident Action Plan
IC	Incident Controller
IMT	Incident Management Team
JSP	Job Safety Plan
ISP	Incident Shift Plan
NEP	Natural Environment Programs
OHS	Occupational Health and Safety
POCTA	Prevention Of Cruelty To Animals
POWE	Principal Officer Wildlife Emergencies
PPE	Personal Protective Equipment
PV	Parks Victoria
RAC	Regional Agency Commander
RCC	Regional Control Centre
RSPCA	Royal Society for the Prevention of Cruelty to Animals
SAC	State Agency Commander
SCC	State Control Centre
SDO	State Duty Officer
SEMP	State Emergency Management Plan
SOI	Safe Operating Instruction
SRRS	State Resource Request System
SWMS	Safe Work Method Statement
SWP	Safe Work Procedure
VICSES	Victoria State Emergency Services
VMIA	Victorian Managed Insurance Agency
WESN	Wildlife Emergency Support Network
ZV	Zoos Victoria

Response guide



1. Introduction

Flying-fox populations across Australia are threatened by extreme heat events and other stressors associated with human activity. Although they have evolved to deal with high temperatures for short periods, flying-foxes are not well equipped to deal with prolonged high temperatures and low humidity. During the Summer of 2019/20, heat stress caused the death of tens of thousands of flying-foxes across eastern Australia. These events are expected to become more frequent across Australia due to climate change.

The Department of Energy, Environment and Climate Action (DEECA) is the designated lead control agency for responding to wildlife welfare arising from a declared emergency event. Under the *Victorian Emergency Management Act 2013* (EM Act) and the *State Emergency Management Plan* (SEMP), extreme heat is considered an emergency event. The *State Emergency Response Plan Extreme Heat Sub-Plan* (Extreme Heat Sub-plan) defines extreme heat events as being:

> 'low-intensity, severe and extreme heatwaves (three or more consecutive days of high temperatures) or one or two days of abnormal high temperatures which would impact the general population and include consequences for essential services, energy and water supply, health and wellbeing and the environment' (page 9).

The *Victorian Response Plan for Heat Stress in Flying-foxes* (the Plan) is focused on the arrangements for preparing for and responding to the impacts of extreme heat emergencies on flying-foxes in Victoria. For flying-foxes the Plan defines the extreme heat threshold as a forecast temperature in excess of 38°C and a Relative Humidity below 30 per cent, unless otherwise defined within individual Camp Heat Stress Plans.

Unlike other wildlife emergencies, flying-fox heat stress events can be anticipated to a degree and the impacts mitigated by weather forecasting, careful monitoring of flying-fox behaviours and good on-ground preparation. The Plan provides advice on prevention along with protocols for preparedness and response to heat stress in flying-fox colonies in Victoria.

The Plan formalises DEECA's accountability for flying-fox heat stress events by adopting standardised emergency response structures and arrangements, consistent with other emergency events within Victoria. Critical to the successful implementation of the response arrangements outlined in the Plan are strong partnerships across government agencies, non-government organisations, traditional owners and land managers.

DEECA's approach to managing wildlife emergencies is to protect human safety, minimise harm and suffering to wildlife and ensure that animals are treated humanely. This approach translates into three key guiding principles for flying-fox heat stress response in Victoria:

- Human safety is the highest priority
- Disturbance to flying-fox camps is minimised as far as possible
- Response teams include local knowledge and flying-fox behavioural expertise.

Given the dispersed location and size of flying-fox camps across Victoria, DEECA will focus this plan and its response arrangements on the camps with the largest numbers of animals and have a history of heat stress events.

This plan will be phased in over the 2023/24 summer period with further engagement occurring with land managers and other stake holders throughout 2024.

2. Purpose

The purpose of the Plan is to provide a framework to define the standards, policies, and arrangements for responding to flying-fox heat stress in Victoria. This plan ensures:

- a process to enable the safe involvement of employees, land managers, traditional owners, staff, contractors, and volunteers is established, utilised, and regularly reviewed
- wildlife welfare is managed in an effective and humane manner aligned with the state emergency management priorities
- a clear end-to-end process is established from field assessment to capture and treatment or euthanasia through to rehabilitation and release of flying-foxes impacted by extreme heat events
- evidence-based 'best practice' standard operating procedures and protocols for responding are applied to flying-foxes impacted by extreme heat events in Victoria.

2.1 Scope

The Plan provides information on measures for reducing the risk and impact of extreme heat events on flying-foxes and describes arrangements for responding to flying-fox heat stress under Victoria's emergency management framework, including:

- Roles and responsibilities
- Safety standards
- Forecasting, surveillance and response triggers
- Response protocols and procedures.

- The Plan does not provide:
  - Veterinary treatment protocols for heat affected flying-foxes
  - Rehabilitation and release protocols for flying-foxes in long-term care (covered by Victorian Wildlife Rehabilitation Guidelines)
  - Location-specific information and arrangements for individual camps (provided in Camp Heat Stress Plans – see Section 3.8)
  - Identification of priority camps based on size and vulnerability to extreme heat events.

2.2 Camp Heat Stress Plans

A flying-fox camp is defined as any area where flying-foxes roost. Camps may be permanent, seasonal, or temporary. Camp numbers may vary from a few animals to over 10,000 animals.

Camp Heat Stress Plans will be developed for large high-risk camps likely to be impacted by heat stress in Victoria. The development and maintenance of these plans are the responsibility of the relevant public land manager in consultation with Traditional Owners, the relevant DEECA region, veterinarians and wildlife carers. Where a camp is established on private land, DEECA will work with the relevant land manager on the development of the camp plan.

Camp Heat Stress Plans must be consistent with the state-wide arrangements and standards for responding to flying-fox heat stress as set out in the Plan. Camp Heat Stress Plans sit under the Plan and provide detail on local readiness and response arrangements for individual flying-fox camps. They should specify:

- Local preparedness activities
- Local risk levels and response triggers
- Local heat stress surveillance arrangements
- Location-specific response activities
- Local resources, locations, and contacts.

Camp Heat Stress Plans should specify where to source veterinary services and volunteers and the process for checking vaccination status. DEECA can assist by obtaining lists of fully vaccinated volunteers at the beginning of each season, see Section 4.8.2. Camp Heat Stress Plans should also outline how the land manager will conduct pre-season briefings and engage those involved in implementing the plan each year, including volunteers.

Camp Heat Stress Plans should be endorsed by Traditional Owners and DEECA. For DEECA, this endorsement will be the Regional Director, Forest, and Fire Operations. Camp Heat Stress Plan may be considered for incorporation into DEECA Emergency Readiness and Response Plans and/or council management plans.

A Camp Heat Stress Plan template is provided in Appendix 2.

Figure 1: Grey headed flying-fox (*Pteropus poliocephalus*)

3. Roles and responsibilities

3.1 Legal authority

As defined in the SEMP, DEECA is the lead control agency for responding to wildlife welfare arising from a declared emergency event. The Extreme Heat Sub-plan defines activities associated with responding to wildlife welfare issues arising from an extreme heat emergency are confined to dense single native species populations. DEECA confines wildlife extreme heat response preparedness and response activities to large flying-fox camps.

The EM Act defines emergencies as falling under two different categories – Class 1 and Class 2. These are defined in Table 1. Under the EM Act and the SEMP, wildlife welfare arising from an emergency event (including extreme heat) is a Class 2 emergency.

Incidents of wildlife welfare arising from an emergency event are further categorised into three levels. Each level is determined by the scale and impact of the incident (refer to Section 3.7; Table 2).

Table 1: Emergency class definitions within Victoria

Emergency Class	Definition
1	A major fire or any other major emergency for which the control agency is the Fire Rescue Victoria (FRV), Country Fire Authority (CFA) or Victoria State Emergency Services (VICSES).
2	A major emergency that is not: • a Class 1 emergency or • a warlike act or act of terrorism, whether directed at Victoria or at any other state or territory of the Commonwealth. Class 2 emergencies include: • Cetacean entanglement stranding and vessel strike • Wildlife affected by marine pollution • Wildlife welfare arising from a declared emergency (including extreme heat).

3.2 Emergency Management Principles

Victoria bases its emergency management arrangements on the adherence to the following principles:

Control:	The overall direction of response activities in an emergency, operating horizontally across agencies.
Command	The internal direction of personnel and resources of an agency, operating vertically within the agency
Coordination	The bringing together of agencies and resources to ensure effective preparation for, response to and recovery from emergencies.
Consequence	The management of the effect of emergencies on individuals, the community, infrastructure, and the environment.
Communication	The engagement and provision of information across agencies and proactively with the community to prepare for, respond to and recover from emergencies.
Community connection	The understanding and connecting with trusted networks, trusted leaders, and all communities to support resilience and decision-making.

3.3 State Emergency Management Priorities

The State Emergency Management Priorities underpin and guide all decisions during a response to any emergency. The priorities are:

- Protection and preservation of life and relief of suffering is paramount. This includes:
  - safety of emergency response personnel
  - safety of community members including vulnerable community members and visitors/tourists
- Issuing of community information and community warnings detailing incident information that is timely, relevant, and tailored to assist community members make informed decisions about their safety
- Protection of critical infrastructure and community assets that support community resilience
- Protection of residential property as a place of primary residence
- Protection of assets supporting individual livelihoods and economic production that supports individual and community financial sustainability
- Protection of environmental and conservation assets that considers the cultural, biodiversity, and social values of the environment.

3.4 The Australasian Inter-service Incident Management System (AIIMS)

In line with Victorian emergency response arrangements, wildlife emergency response adopts a standardised approach to incident management known as the Australasian Inter-service Incident Management System (AIIMS). AIIMS is founded on five fundamental principles:

Flexibility	AIIMS is adaptable to an all hazards-all agency environment. It needs to be able to respond to changes that occur with the evolution of an incident, both during escalation and resolution, and from a focus on response to a focus on community and agency recovery.
Management by objectives	A process of management where the Incident Controller (IC), consulting as appropriate with the Incident Management Team (IMT) and supporting agencies, determines the desired outcomes for the incident.
Functional management	The process of structuring an organisation into sections or units based on the type of work to be performed. AIIMS identifies a number of critical functions that are required to be undertaken to manage an emergency incident effectively.
Span of control	A principle that needs to be applied in both the structuring and staffing of an IMT. The concept relates to the number of groups or individuals that can successfully be supervised by one person. No more than five reporting groups or individuals is considered desirable.
Unity of command	There is one set of common objectives for all those involved in the response to an incident, leading to one consolidated plan for all responders. Each subordinate should report to only one supervisor

3.5 State response arrangements

3.5.1 Response tiers

Emergency management response in Victoria operates at three tiers: incident, region and state. The regional and state tiers are activated when there is a significant event anticipated, underway or when an incident may last for an extended period. The region and state tiers support the IMT through coordination of resources at each level.

3.5.1.1 Incident level arrangements

To lead and ensure coordination of response activities mitigating an emergency event, an IMT led by an IC is appointed. This team will consist of sufficient people to perform all the functions required to address the emergency. The IC will assume overall command of the incident and will keep the Regional Agency Commander (RAC) informed throughout response.

3.5.1.2 Regional level arrangements

DEECA delivers its services and programs through six geographic regions across Victoria. Each of the six regions have in place emergency response arrangements led by a RAC. Within each region are a number of districts with a District Duty Officer (DDO). Individual Camp Heat Stress Plans will provide direction to the relevant DDO or RAC about the response arrangements that need to be put in place during extreme heat events and appropriate decisions relating to escalation and de-escalation of response activities and resources.

3.5.1.3 State level arrangements

The State Agency Commander (SAC) is the role that (acting on behalf of the DEECA Chief Fire Officer) is responsible for the overall coordination of DEECA's response to fire and other emergencies. This role is based in the State Control Centre (SCC). The six RACs report to the DEECA SAC.

3.5.2 State Control Centre (SCC)

The SCC is the state's primary control centre for management of Class 1 and some Class 2 emergencies; it is the hub of a network of Regional Control Centres (RCC), which support IMTs. In some cases, Class 2 emergencies may be managed from another location depending on the size, type and nature of the incident.

The SCC is led by the State Response Controller. This position is always in place and leads and manages the operational response to a Class 1 emergency.

3.5.3 State Controller (Wildlife)

As the officer in charge of a control agency for Class 2 emergency events, DEECA's Secretary is responsible for considering the need for and appointment of a State Controller, in consultation with the Emergency Management Commissioner (EMC) and others as appropriate. Section 39 of the EM Act states:

(2) The officer in charge of an agency having overall control of response activities in relation to a Class 2 emergency may—

(a) appoint one or more controllers in relation to-

i. planning for each anticipated Class 2 emergency in any area of the State; and

ii. each Class 2 emergency in any area of the State that is occurring or has occurred; or

(b) transfer control of any response activity to one or more other persons.

Appointments and revocations for this role occur through the Secretary executing a signed instrument that identifies a person(s) and dates of operation. This role is based in the SCC.

Typically, a Class 2 State Controller (Wildlife) will only be required for a complex Level 3 incident or where there are a number of other wildlife emergency incidents occurring at the same time. It is less likely that a Class 2 State Controller (Wildlife) will be appointed a stand-alone extreme heat event.

3.5.4 State Duty Officer (Wildlife Emergencies)

The SDO (Wildlife Emergencies) is a DEECA-led role that is responsible for the provision of hazard-specific response advice to the State Response Controller or Class 2 State Controller (Wildlife) (where appointed), SAC, the six RAC's and ICs. This will include advice on appropriate protocols, resourcing and response options as outlined in the Plan.

This role is rostered and is in place 24 hours a day, 7 days a week and reports to the SAC.

3.5.5 Principal Officer Wildlife Emergencies (POWE)

The POWE is an ongoing role within DEECA as a subject matter expert for wildlife emergencies. The POWE is responsible for the strategic development and management of response plans, stakeholder relationships, policies, and procedures in relation to wildlife emergencies. The POWE coordinates and mentors the SDO (Wildlife Emergencies) and is the key point for agencies on wildlife emergency matters outside of incident response.

3.5.6 Forest Fire Management Victoria (FFMVic)

DEECA delivers its emergency response activities through FFMVic. FFMVic provides specialist accredited emergency resources drawn from DEECA, Parks Victoria (PV), Melbourne Water and VicForests. Under the Plan, FFMVic personnel will deliver flying-fox heat stress response in partnership with land managers and members of the wildlife welfare sector through its normal emergency response arrangements.

3.5.7 Response Partners

3.5.7.1 Traditional Owners (TOs)

DEECA works with a range of partners on flying-fox heat stress including TOs, land managers, volunteers, and veterinarians.

DEECA partners with TOs in the implementation of wildlife emergency response arrangements in a range of different ways. The level of involvement by TOs in flying-fox heat stress response may vary depending on the assertions of the relevant TO organisation. Some TO organisations may wish to participate directly in response or provide advice regarding response arrangements. Others may wish to be kept informed and updated. TO interests and assertions should be considered and incorporated into Camp Heat Stress Plans, which should specify the particular local arrangements and contacts for each camp.

3.5.7.2 Land Managers

Land managers play a critical role in both prevention and response. Land managers for flying-fox camps in Victoria include Parks Victoria, local government, committees of management, statutory authorities, and private landholders.

3.5.7.3 Volunteers and veterinary support

Volunteers also play a critical role in camp surveillance and response activities throughout the year. Volunteers are invaluable during periods of heat stress due to their local knowledge and experience with flying-foxes. Volunteers may be sourced from affiliated/incorporated organisations, such as Wildlife Victoria or Friends of Bats and Bushcare, or individually, provided they are authorised as wildlife shelter operators or foster carers under the *Wildlife Act 1975*.

Veterinary support is vital to heat stress response in the assessment, triage, and treatment of flying-foxes during events. Veterinary services for flying-fox heat stress events are provided by Zoos Victoria (ZV) and private veterinary practices.

The Wildlife Emergency Support Network (WESN) has been established to support DEECA in the recruitment, training, accreditation and deployment of veterinary services and wildlife volunteers to wildlife emergencies. The WESN may be used to source these resources for flying-fox heat stress response.

Camp Heat Stress Plans (see Section 2.2) will outline arrangements for deployment of preferred partners, including contacts, roles, and deployment arrangements.

Further information on the roles and responsibilities of partners during heat stress events can be found in Section 3.10

3.6 Incident management

When a declared emergency occurs, the designated Control Agency nominates an IC to lead the response to the incident. The IC establishes an IMT to undertake the functions of control, planning, intelligence, public information, operations, investigation, logistics and finance. These roles may be undertaken by appropriately trained and accredited individuals from across the emergency management sector.

For wildlife emergencies, defined wildlife roles will be deployed under the planning and operations functions. A flying-fox technical specialist may be appointed to the IMT where flying-fox heat stress expertise is required.

The IMT develops an Incident Action Plan (IAP) which is used to describe the incident objectives, strategies, structures, resources, and other information relevant to the control of the incident. It also contains the Incident Shift Plan (ISP) that outlines the essential elements of field operations for the incident, and how human resources will be managed across the incident. Information in the IAP is shared with response teams during briefings.

3.7 Incident levels

In accordance with the principles of AIIMS, incident levels are a function of the scale or significance of the incident and the management structure required to deal with it. As an incident grows in size, duration, complexity or risk, there will be a corresponding need for the incident management structure and response activities to expand.

Wildlife emergencies are classed in scale from Level 1 (smaller) to Level 3 (larger). There are several indicators to guide decisions about incident level. These include wildlife welfare impacts, as well as other factors such as the scale and complexity of the required response.

Table 2: Indicators to determine flying-fox heat stress incident levels

Incident Level	Indicators
Level 1	• Incident utilises local resources • May include other agencies. • IC probably undertaking more than one function • Second shift unlikely to be required • Weather forecasted to meet thresholds set out in the Plan/Camp Heat Stress Plans • Surveillance and set up carried out by locally available resources in accordance with Camp Heat Stress Plan
Level 2	• Expected that the incident will be controlled within 48 hours • Resources from other locations are involved • IC may be undertaking more than one function but will normally have delegated at least the Operations function. • On-site triage facility required • Heat stress behaviours exhibited, and some intervention (mostly cooling) required
Level 3	• Normally but not necessarily involve several agencies • Normally expected to exceed 48 hours • Incident Controller will normally have delegated all functions • On-site triage facility required • Flying-foxes un-responsive and requiring capture for treatment

The IC will determine the required scale of the wildlife emergency response and what roles should be deployed. This occurs following an assessment of the event, taking into consideration predictions of future impacts and current information on flying-fox behaviours in the colony.

Wildlife response activities are focused on addressing the immediate welfare of flying-foxes impacted by extreme heat. The scale of the response for flying-fox heat stress events will largely be determined by the complexity of the event including the scale of intervention required and management of volunteers and

visitors. Indicators to guide IC decision making on incident levels are outlined in Table 2. Note that these indicators are provided for guidance only.

3.8 Response scale, structure, and composition

When DEECA identifies, or is notified by the relevant land manager, that a response is required, the RAC or DDO will activate emergency response procedures. Depending on the arrangements that are in place within the DEECA Region on any given day, the initial phase of the response may be led by either the RAC, DDO, or an IC may be appointed.

The response will be scaled according to need and may be escalated or de-escalated over the course of the event. This will be reviewed regularly by the IMT with advice from the field and/or IMT technical specialist if appointed and will depend on changes to the operating environment, including personnel safety, complexity of the response and the scale of flying-fox intervention required.

The initial phase of an incident will utilise locally available resources in accordance with Camp Heat Stress Plans. Deployed resources will conduct surveillance on the behaviours of the flying-foxes in the colony, prepare for a possible event and provide information to the IMT which will inform decisions on active intervention and the appropriate level of response.

Figure 1 details the IMT structure for a Level 1 response. In this example, there is one Wildlife Field Assessment Team reporting directly to the DDO or RAC. An IC may be appointed, and more than one Field Assessment Team may be required. A Wildlife Field Assessment Team will consist of two trained, accredited and vaccinated (See Section 4.3) personnel, with one being designated as a Wildlife Field Assessment Team Leader.

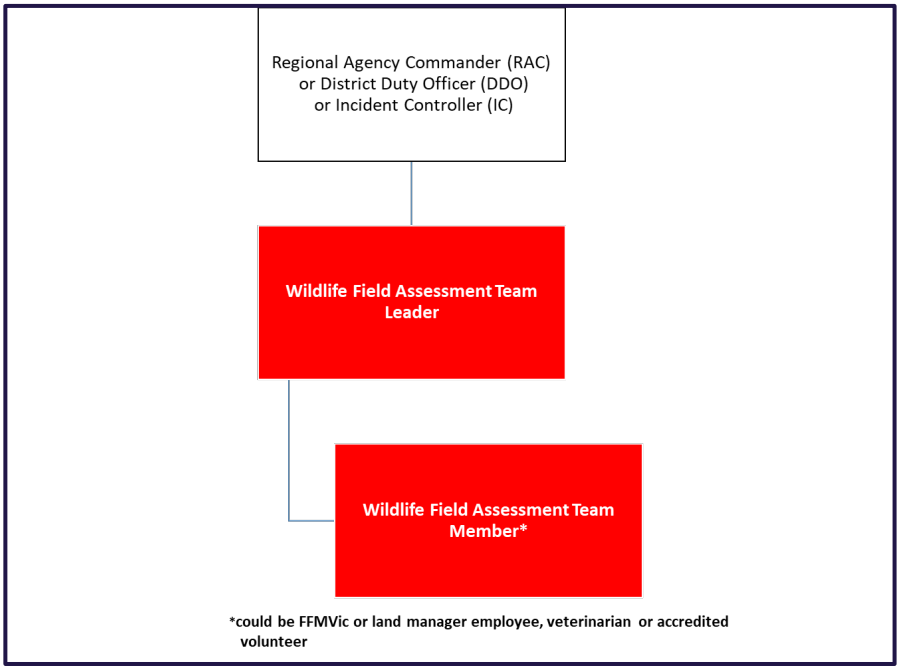


Figure 2: IMT structure for a Level 1 incident response

Figure 2 outlines an IMT structure for a Level 2 response. This includes the appointment of an IC, a Planning Officer, an Operations Officer, and a Logistics Officer. The IC, Planning Officer, Logistics Officer and Operations Officer roles will be accredited IMT roles filled by FFMVic members carrying out all functions normally associated with the running of the IMT. For Level 2 flying-fox heat stress events, up to five Wildlife Field Assessment Teams of up to five people may be established as required. Each team may be tasked as a Sector undertaking different functions such as cooling, transport, and triage. This allows for the efficient application of defined skillsets to particular tasks.

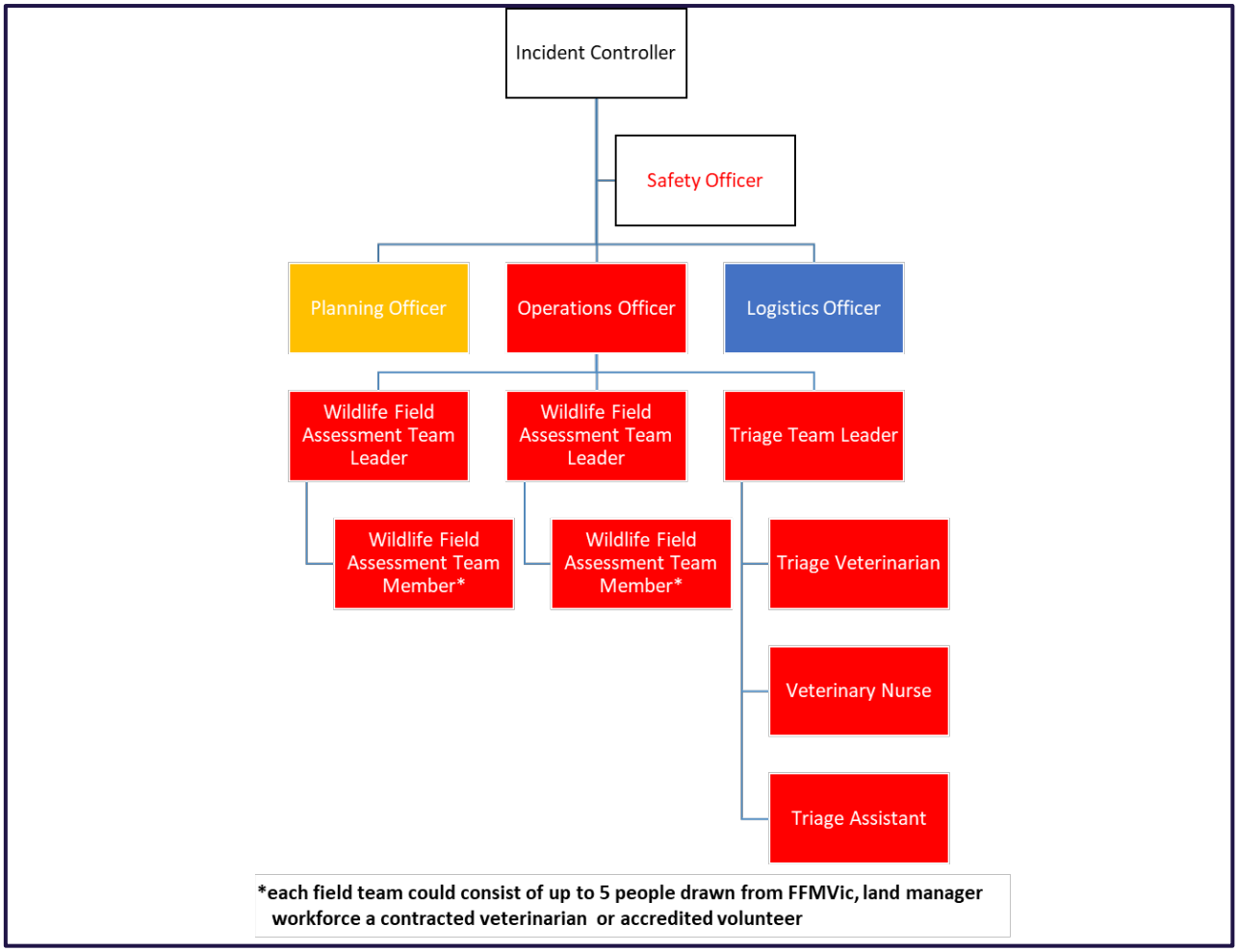


Figure 3: IMT structure for a Level 2 incident response

When numbers of flying-foxes requiring veterinary treatment escalate significantly and the event becomes more complex, the incident scales up to a Level 3 event. In Level 3 events a Wildlife Triage Team Leader will likely be required, reporting to the Operations Officer. Figure 3 identifies how the wildlife operational response should be managed in Level 3 incidents.

Note that, as long as any field activities are required, the IMT will remain in place. This is essential to ensure DEECA fulfils its wildlife welfare responsibilities and provides for the safe an effective deployment, management and deactivation of FFMVic personnel, contractors and volunteers.

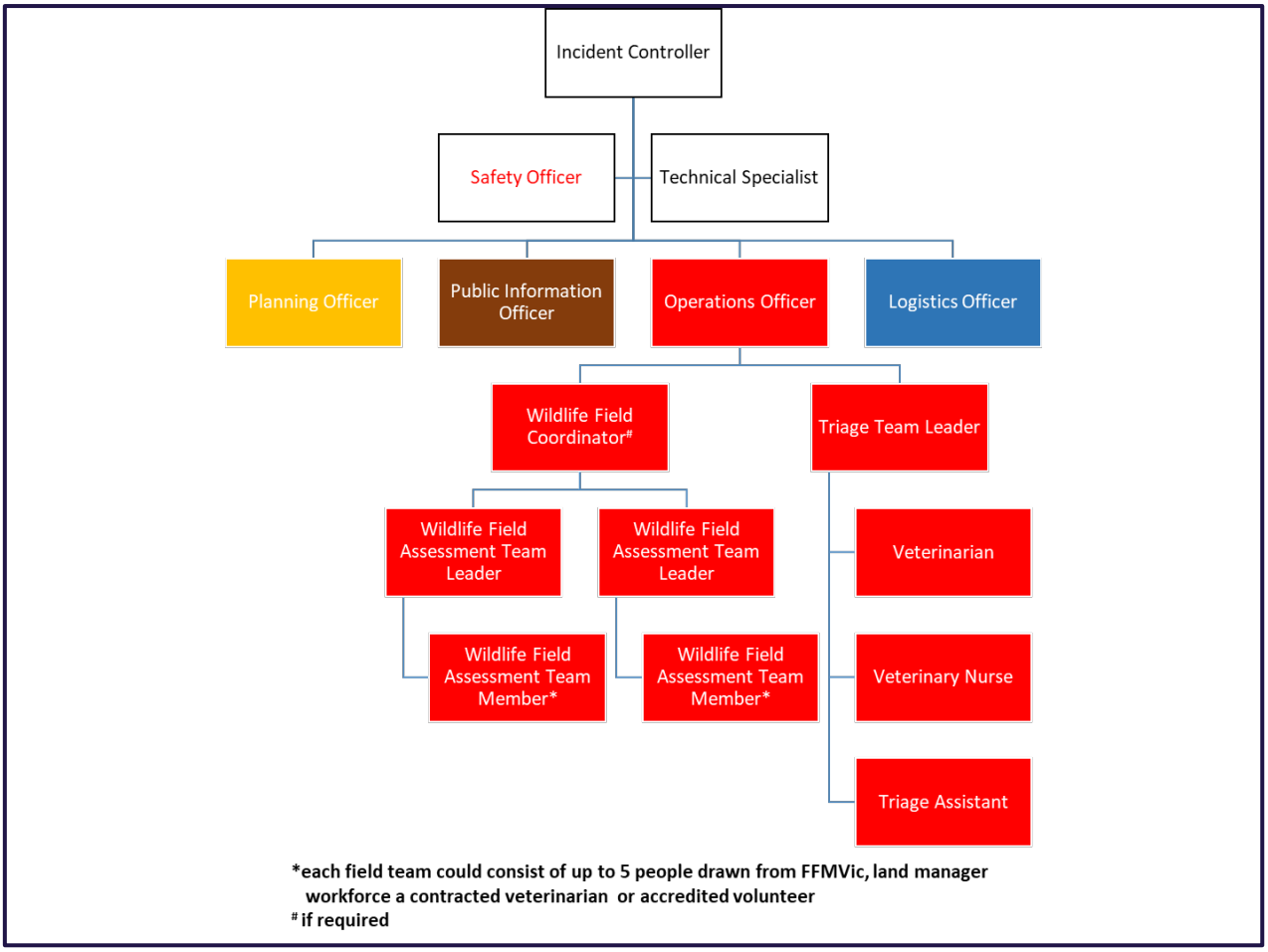


Figure 4: Possible IMT structure for a Level 3 incident response

3.9 Response roles

3.9.1 Planning

3.9.1.1 Planning Officer

The Planning Officer sits in the Incident Control Centre. The Planning Officer is a FFMVic member who provides the strategic direction and priorities for on ground activities and ensures that response activities are developed and coordinated. This role is responsible for the development of a wildlife IAP.

At Level 1, where only surveillance and preparation activities are occurring, the Camp Heat Stress Plan will guide all activities. For Level 2 and 3 responses, a Planning Officer will be appointed and an IAP developed. The IAP will be guided and informed by the Camp Heat Stress Plan and intelligence from the field and will include:

- The level and structure of resourcing required on ground, including the requirement, location, and resources for triage units
- Communications plan
- Appropriate safety documentation such as a Job Safety Plan (JSP) and Safe Work Procedures (SWP)
- A process for engagement with veterinary and volunteer resources.

Note that the Planning Officer role is the same role as the Wildlife Coordinator role at fires. When a flying-fox heat stress response is integrated into a broader emergency IMT (e.g., fire), a Wildlife Coordinator, reporting to the Planning Officer should be appointed to undertake these duties.

3.9.2 Operations

3.9.2.1 Operations Officer

Field-based response activities in flying-fox heat stress events will be carried out by Wildlife Field Assessment Teams falling under the Operations Section of the IMT. At Level 1, where surveillance and preparation activities are occurring, these teams may report directly to the DDO/RAC or IC if appointed. For Level 2 and 3 incidents, these teams fall under the direction of the Operations Officer.

The Operations Officer is responsible for enacting the Camp Heat Stress Plan or the IAP prepared by the Planning Officer. This role is a FFMVic member reporting to the IC and is responsible for all field operations. This role is field based for flying-fox heat stress events. If five or more field teams are required, a Wildlife Field Coordinator role should be appointed to support the Operations Officer.

3.9.2.2 Wildlife Field Assessment Teams

Wildlife Field Assessment Teams will be deployed to undertake the on-ground activities in accordance with Camp Heat Stress Plans and/or the IAP. Led by a Wildlife Field Assessment Team Leader, each Wildlife Field Assessment Team will consist of up to five individuals. The minimum team should be two individuals, and each should have communication equipment.

Wildlife Field Assessment Team Leaders will report to the Operations Officer or the Wildlife Field Coordinator. For Level 1 incidents, the Wildlife Field Assessment Team Leader may report to the RAC/DDO or an IC if appointed.

Wildlife Field Assessment Team members and Team Leaders must be vaccinated, trained, accredited (see Section 4.3) and at least one member of each team must have experience in the assessment of flying-fox heat stress behaviours. Wildlife Field Assessment Team members may be drawn from:

- FFMVic
- Land managers
- Veterinarians
- Volunteer rehabilitators and rescuers.

All teams must adhere to their assigned activities. No team member is to undertake non-directed activities. If the team needs to change or split, this must be approved by the Operations Officer or Wildlife Field Coordinator and Planning Officer.

3.9.2.3 Transporters

There may be a need to transport flying-foxes from the camp to a triage unit or a local shelter for longer term care and rehabilitation. Wildlife Field Assessment Team members may be utilised for transport of flying-foxes. Transport resources may be requested and deployed by the IMT as needed. Volunteers and contractors cannot drive government vehicles.

3.9.2.4 Triage Unit

A triage unit in a heat stress event is a simple set up (e.g., marquee, table, chairs). Distressed and unresponsive flying-foxes brought into triage are assessed by the Triage Veterinarian. Depending on status, they are given supportive care (oral and subcutaneous fluids) and then placed within an air-conditioned space where they will be monitored and rehydrated throughout the day. When the ambient temperature has dropped and the colony shows signs of recovery from heat stress, the flying-foxes will be assessed for release and released into the colony. Flying-foxes that are unable to be released will be taken into care or euthanised as appropriate, following discussion between the Triage Veterinarian and an expert flying-fox carer.

The triage team works collaboratively to ensure the efficient running of the triage unit. The triage team will consist of veterinarians, veterinary nurses, and veterinary assistants. A Triage Team Leader will be responsible for the operation of the triage unit. They will ensure it is adequately resourced and that standard DEECA emergency and veterinary procedures and processes are maintained. The Triage Team Leader is drawn from FFMVic and reports directly to the Operations Officer.

The Triage Veterinarian is responsible for the assessment, prognosis and treatment of all wildlife presented at the triage unit in accordance with protocols for heat affected flying-foxes developed and approved by DEECA and Zoos Victoria. Veterinarians are the only triage team member legally permitted to dispense scheduled drugs as per the *Drugs, Poisons and Controlled Substances Act 1981* and the *Agriculture and Veterinary Chemicals (Victoria) Act 1994*.

Veterinary nurses work in a supportive role and provide care for flying-foxes under the supervision of the Triage Veterinarian. Veterinary nurses may also undertake additional duties managing triage stock and record keeping and management within the triage unit.

Triage assistants provide support to the effective running of the triage unit. Duties may include animal husbandry, animal observation and record keeping. Triage Assistants may be drawn from FFMVic, or volunteers.

Veterinary nurses, triage assistants and volunteers must work under the supervision of veterinarians.

3.9.3 Technical Specialist

A technical specialist role may be appointed to the IMT when flying-fox heat stress expertise is lacking. While knowledge and experience with heat stress in flying-foxes is a prerequisite for field assessment teams, it is not required for the IC, Planning and Operations Officer roles. Therefore, the IC may wish to appoint a technical specialist to the IMT to support and advise the IMT, particularly in the preparation of an Options Analysis and the development of the IAP.

3.10 Deployment arrangements

DEECA will issue a request to individuals who are to be deployed as part of an IMT. The deployment will confirm the role to be undertaken and its expected duration. Where a role requires DEECA accreditation, or training or expertise, DEECA will confirm the requirements are met prior to deployment. All individuals deployed to an incident should be formally recorded in the IAP and shift plans that will be developed by the Planning Section of the IMT.

3.10.1 FFMVic staff

FFMVic staff are deployed into IMT and wildlife roles through the normal FFMVic regional deployment process. The RAC/DDO/IC will make formal requests for FFMVic staff to fill specific roles. Generally, each DEECA Region will try to fill these roles locally first. However, at peak times and larger incidents, additional staff can be deployed from other Regions.

Personnel will only be committed to these roles if they are vaccinated and appropriately trained and equipped with the appropriate qualifications or authorisations (see Section 4.3).

3.10.2 Veterinary support

Veterinarians and veterinary nurses may be deployed in Wildlife Field Assessment Teams to assist in the assessment of wildlife in the field or to the Triage Unit undertaking detailed assessment and treatment of wildlife.

Veterinary support can be sourced locally or through the WESN. Camp Heat Stress Plans should specify where to source veterinary support. Only veterinary personnel who are vaccinated and fully qualified, and registered in Victoria, can be deployed to flying-fox heat stress events (see Section 4.3).

3.10.3 Volunteers

Vaccinated, trained and accredited (See section 4) volunteers can be deployed to carry out field-based activities such as surveillance, spraying and misting, capture and transport of flying-foxes. All activities must be carried out under the command of the IC and can only occur within established emergency management structures in order to maintain personal safety, prevent duplication of effort and ensure the efficient and effective use of resources. Volunteers must come with appropriate PPE. Some PPE may be provided (See section 4.1.8).

Adherence to IMT registration, communication and reporting procedures, and the adoption of hazard specific safety measures is required. In accordance with the *Wildlife Emergency Volunteer Manual*, volunteers will be required to complete a health and fitness declaration prior to deployment (See Section 4.7)

Volunteers do not receive financial remuneration for their deployment. However, meals and accommodation will be supplied by the IMT when in place and when required. Depending on the distance from an individual's home to the incident, transport may also be arranged.

For safety reasons, spontaneous volunteers are not able to be utilised during these types of events. All volunteer deployments must be approved by the IC. Any person who self deploys will be removed from the incident. Victoria Police may be required to assist if necessary.

Volunteers may be sourced by the IMT either locally or via the WESN in line with local arrangements as defined in the Camp Heat Stress Plan.

Volunteers will be asked to provide personal details to enable them to be registered on DEECA's learning and fire deployment systems.

Further information on volunteering during wildlife emergencies can be found here.

3.10.4 Wildlife Emergency Support Network

The WESN can supply accredited and vaccinated individuals into defined wildlife emergency roles at the request of an IMT, including:

- Veterinarians (field or triage unit based)
- Veterinary nurses
- Triage assistants
- Wildlife volunteers (wildlife rehabilitators rescuers or transporters).

When the IC determines that WESN resources are required, a request will be made to the SCC. The SDO (Wildlife Emergencies) will contact the WESN Coordinator to discuss the request and seek to fulfil roles requested. The WESN Coordinator will engage with members of WESN to identify suitable individuals within the network and nominate them to the SDO (Wildlife Emergencies). The SCC will provide deployment details such as location, shift length, transport, and any other relevant details back to the WESN Coordinator.

Members of WESN must meet specified training and accreditation requirements before they can be deployed. Coordination of accredited training is managed jointly between DEECA and the WESN Coordinator. This training will be competency based, requiring participants to demonstrate the required skills and pass defined assessment tasks. Confirmation of health, vaccination and physical fitness will also be required at the time of deployment. Training and accreditation do not guarantee deployment in a season or to any incident.

The deployment of veterinary staff and volunteers to flying-fox heat stress events must be done in accordance with Camp Heat Stress Plans. Camp Heat Stress Plans may specify either the use of WESN or other arrangements for deployment of veterinary staff and volunteers.

4. Standards

4.1 Workplace Health and Safety

DEECA is committed to meeting its workplace safety obligations for all personnel involved in emergency response operations as required under the *Occupational Health and Safety Act 2004* (the OHS Act).

Under Section 21 of the OHS Act, employers have an obligation to '*provide such information, instruction, training or supervision to employees of the employer as is necessary to enable those persons to perform their work in a way that is safe and without risks to health.*' This obligation is extended to engaged contractors and volunteers deployed directly by an agency.

The safety, health, and welfare of incident personnel, including volunteers, is always the overarching priority for fire agencies. Safety will not be compromised to undertake any single activity.

The OHS Act also requires that while at work, employees must take reasonable care for their own safety and the safety of others who may be affected by their actions or omissions. They must also cooperate with any actions taken by their employer to comply with the OHS Act and regulations.

An employee must not intentionally or recklessly interfere with or misuse anything provided at the workplace in the interests of health, safety, and welfare.

DEECA recognises that emergency incidents present an inherently dangerous workplace that provides workplace health and safety challenges that would not normally be encountered in the workplace. For this reason, the "Safe Person Approach" is adopted to ensure individuals are as safe as possible within the dynamic working environment encountered during emergency response operations.

This approach includes a commitment that ICs, Agency Commanders and IMTs must direct their efforts to making personnel safe by adopting the following measures:

- systematically identifying, assessing and treating hazards and Occupational Health and Safety (OHS) risks
- ensuring only adequately trained and competent personnel participate in incident operations
- ensuring risk and near miss reporting and mitigation processes are systematically employed
- ensuring safety is an integral part of the IAP, orders and briefings
- having safe systems of work
- having recognition by all people working at the incident (including volunteers and contractors) of their specific responsibility to deliver a safe working environment, and
- ensuring personnel are issued with and use appropriate personnel protective equipment.

4.1.1 Safety principles

The health and safety of personnel is the overarching principle in the development and implementation of all policies and procedures contained in this manual. Wildlife emergency response work carries inherent risks, some of which are significant. Hazards specific to wildlife affected by heat stress include:

- exposure to heat, wind, and sun
- dehydration
- fatigue
- falling tree limbs
- critical incident stress
- compassion fatigue
- injury inflicted by equipment or animals
- illness or disease transmitted by contact with animals – specifically exposure to Australian Bat Lyssavirus
- handling and use of scheduled drugs.

The safety principles of wildlife emergency response are:

- human safety is the highest priority, never place wildlife welfare above human safety

- never succumb to pressure to initiate an action that has not been thoroughly thought through
- always keep lines of communication open
- approach all wildlife with caution as their behaviour can be unpredictable and potentially harmful, particularly when injured or stressed.

All operational activities must comply with relevant departmental OHS standards and guidelines.

A JSP must be prepared and be in place at the commencement of a response. Relevant activity specific Safe Work Procedures (SWPs), or Safe Work Management Statements (SWMSs) and Safe Operating Instructions (SOIs) must be in place and adhered to. Safety documents should be prepared as part of the development of Camp Heat Stress Plans.

4.1.2 Incident reports

Any safety and wellbeing incidents or near misses must be reported immediately to the relevant team or site leader. This must then be reported to the responsible officer for the incident. Details must be recorded on an OHS Incident Report Card which must then be logged in the DEECA incident reporting system by the Logistics or Medical Services Unit (depending on the size of the event) and reported up to the IC.

4.1.3 Fatigue

The DEECA *Fatigue Management Safety Procedure* outlines the risk control strategies to be adopted to minimise the contribution of fatigue to workplace injury and illness.

In emergency situations, the IC must ensure that shifts are planned and managed in line with DEECA fatigue management guidelines to minimise the impact on crew safety.

4.1.4 Working at night

Split shifts/night shifts should be considered where needed to effectively manage the event. Dawn and dusk are the best times to carry out preparation and pack up activities. If this is to occur, it must be approved by the IC and included in the IAP and must consider individual shift lengths. A change in shift may be required to undertake activities later in the day or night.

4.1.5 Zoonotic disease

All personnel working with wildlife should be aware of the potential for zoonotic disease (disease that can be transferred from animals to humans), and appropriate safety measures should be considered when planning the wildlife emergency response.

Australian Bat Lyssavirus (ABLV) can be transmitted from bats to humans, livestock, horses, or pets when infected bat saliva enters the body, usually through a bite or scratch. Other risks include bat saliva exposed to the eyes, nose or mouth through aerosol droplets (lower risk), or into a pre-existing break in the skin (such as a cut or wound).

ABLV is more likely to be found in injured or sick bats. Signs of ill-health such as unusual or aggressive behaviour, or other neurological signs such as paralysis or seizures can be suggestive of ABLV infection. However, bats that appear healthy may also carry the virus.

ABLV is unlikely to survive outside the bat or in a dead bat for more than a few hours, especially in dry environments that are exposed to sunlight. Contact with bat faeces, urine or blood do not pose a risk of exposure to ABLV, nor do living, playing, or walking near bat roosting areas.

Further information on ABLV can be found on the Wildlife Health Australia webpage.

Although ABLV is rare, all bats should be treated as if they could be carrying ABLV. Anyone handling bats, flying-foxes or other potentially rabies infected animals or materials must be fully vaccinated against rabies and use protective gear. Therefore, DEECA requires all personnel working in the field with flying-foxes associated with heat stress events must be vaccinated including veterinary staff, land managers, contractors and volunteers (See section 4.1.5.1 below).

4.1.5.1 Vaccinations

(a) Coronavirus

In accordance with directions from the Chief Health Officer public sector employees are required to be fully vaccinated against coronavirus (Covid-19). These requirements apply to all DEECA employees, contractors, and volunteers deployed to heat stress events. Contractors and volunteers are responsible for arranging their own vaccinations.

(b) Rabies

Due to the risk of exposure to ABLV (see Section 4.1.4), DEECA requires all personnel likely to handle or working within camps to be vaccinated against rabies. Individuals (staff, contractors, and volunteers) will only be deployed to a flying-fox heat stress emergency if they can provide proof of current serological titre and meet current Australian Government Department of Health Australian Immunisation Handbook vaccination requirements:

- Full vaccination consists of three intramuscular doses of 1.0 mL rabies vaccine given on days 0, 7 and 21-28
- People with ongoing occupational risk of exposure to lyssavirus are recommended to receive a booster dose of rabies vaccine one year after their first dose
- Serological testing should be conducted every 3 years and the virus neutralising antibody titre should be 0.5IU/mL.

Further information on vaccination requirements can be found on the Commonwealth Health Department website.

DEECA uses its health services provider to manage vaccination records for agencies, contractors, and volunteers. Accredited volunteers will be provided with information on proof of vaccination requirements.

Contractors and volunteers are responsible for arranging and paying for ABLV vaccinations.

4.1.6 Critical incident stress

A critical incident is any situation that causes personnel to experience strong emotional reactions that have the potential to impair their ability to function either at the time of the incident or afterwards.

Critical incidents may involve:

- serious injury or death
- extraordinary and prolonged expenditures of physical and emotional energy
- serious physical or psychological threat or sudden loss
- unusually distressing and emotional situations.

Emergencies involving injured wildlife are considered critical incidents, as there is a strong emotional imperative to intervene. However, the desire or impulse to do so immediately may have the potential to impair rational judgement, place team members at risk and compromise the success of wildlife operations.

Awareness of critical incident stress is an important part of emergency response training. Staff, contractors, and volunteers participating in wildlife assessment operations should be aware of the signs of stress in themselves or others. They should advise the relevant supervisor or the IC if they believe anyone is affected. The IC must ensure appropriate action is undertaken to support the affected individuals.

4.1.6.1 Support services

DEECA provides a range of support resources to support staff, contractors and volunteers involved in emergency management including:

- Critical Incident Stress Management Team
- external counselling services

- peer support
- internal policies and procedures.

DEECA also provides support services through the Employee Assistance Program (EAP) phone or face-to face off site counselling services. The EAP is available for all staff and volunteers and should be included in the JSP and promoted at each shift briefing.

4.1.7 Medicals and fitness

Only trained and qualified FFMVic personnel, with an appropriate medical (Fit for Emergency) accreditation and physical accreditation (Task Based Assessment) appropriate to the task assigned, should be deployed in wildlife emergency incident operations. Medical and fitness requirements are still to be determined for flying-fox heat stress emergencies.

Contractors and volunteers will be asked to sign a health declaration at the commencement of each deployment. Where they are unable or unwilling to sign the declaration, they will not be deployed. Further information on volunteering during wildlife emergencies can be found here.

4.1.8 Insurance

4.1.8.1 Zoos Victoria employees

Veterinarians and vet nurses employed by Zoos Victoria, deployed to flying-fox heat stress events will be covered by Zoos Victoria WorkCover Insurance.

4.1.8.2 Volunteers

Like FFMVic staff, volunteers working with DEECA under supervision and performing a role in the IMT structure are the responsibility of the Secretary of DEECA.

In the event of incurring an injury during deployment, the following financial support is available for volunteers:

- Incorporated volunteer organisations may have their own public liability and personal accident insurance. If involved, they should present their certificate of currency before commencing activities.
- A scheme for the payment of compensation to volunteer emergency workers upon personal injury or property damage is set out in Part 6 of the *Emergency Management Act 1986*.
- Volunteers may be covered under DEECA's personal accident insurance through the Victorian Managed Insurance Agency (VMIA). Volunteers must be registered and sign in and out during each shift.

4.1.9 Personal Protective Equipment

All Wildlife Field Assessment Teams must wear appropriate PPE when deployed to a flying-fox heat stress event to protect against ABLV, as recommended by Wildlife Health Australia:

- Long sleeved shirts and pants
- Covered boots
- Heavy duty/thick Nitrile gloves
- Fingerless gloves (worn over nitrile gloves for personnel working in the field)/long gardening gloves and/or gauntlets
- N95 mask
- Protective eyewear.

Additionally, it is recommended that gaiters be worn for snake protection and hi-vis vests denoting teams/roles.

Camp Heat Stress Plans should provide information on where to source PPE. DEECA will supply masks, goggles and Nitrile gloves for Level 2 and Level 3 heat stress events. Further information on the Wildlife Health Australia recommendations can be found on their website.

4.1.10 Scheduled drugs

Management and the security of scheduled drugs at triage units is the responsibility of the Triage Veterinarian. This includes all appropriate records management relating to Schedule 4 (S4) and Schedule 8 (S8) drugs and euthanasia solution.

4.2 Animal welfare

The primary goal of wildlife emergency response is to facilitate animal welfare. This must be balanced against the need to protect human safety and consider the wellbeing of the entire flying-fox colony. Animal welfare during flying-fox heat stress events is therefore managed in accordance with the response principles outlined in Section 5.3,1. Wildlife welfare is also covered by the *Code of Practice for the Welfare of Wildlife During Rehabilitation* and the *Wildlife Shelter and Foster Carer Authorisation Guide July 2019*.

4.3 Training and accreditation

DEECA has legal obligations to protect the safety and wellbeing of employees, contractors, and volunteers under the OHS Act. Volunteers, like employees, need to be provided with the information, instruction, training, and supervision necessary to enable them to perform their work safely and without risks to health and to also provide for the welfare of wildlife.

In order to be deployed to assist wildlife emergency response activities, individuals must be appropriately trained and accredited. DEECA will define the standards for any training that must be completed. DEECA or an approved partner may deliver this training, with training records being held by DEECA. Some roles or activities may have a currency requirement, whereby an individual may have to either refresh their training or skill set or demonstrate their knowledge in a specific role at specified intervals.

Training and accreditation requirements for participation in flying-fox heat stress events are to be determined.

4.4 Reporting and record keeping

4.4.1 Reporting injured wildlife

Members of the public who come across flying-foxes affected by heat stress can report these directly to DEECA via the Wildlife Emergency app or by phone (see Table 3).

The Wildlife Emergency app, which can be downloaded from either the Google Play store or the Apple store, allows individuals to describe and geolocate the animal by dropping a pin, as well as to upload a photo. This information is sent directly to DEECA for response.

Table 3: Methods for reporting wildlife information during emergency events

Method	Details
App	Wildlife Emergency App (download from Google Play or Apple Store)
Phone	DEECA on 136 186 or Wildlife Victoria on 03 8400 7300

4.4.2 Record Keeping

Appropriate incident and animal records must be created within the DEECA emergency records system for all flying-fox heat stress events. These records will be created by both the field assessment and triage teams and will be held by DEECA. See section 5.3.8 for details on animal and incident records.
Other incident records that must be kept include:

- S8 drug and chemical management records
- Records of animals going into long-term care in the Wildlife Shelter system
- OHS incidents

4.5 Communication

Wildlife Field Assessment Teams will be equipped with radios or mobile phones. For camp surveillance during a Level 1 incident, mobile phone is the preferred mode of communication and Camp Heat Stress Plans should specify arrangements and contacts.

For Level 2 and 3 incidents, the Communications Plan in the IAP will define incident channels determined and allocated by the IMT. The Communications Plan will also document which radios have been allocated to which teams and designated channels for their use or the various mobile phone numbers.

Team Leaders will ensure all team members are briefed in the use of the equipment including safety aspects. No team should be without appropriate communication equipment.

5. Wildlife Response

5.1 Background:

5.1.1 Species information

The Grey Headed Flying-fox (*Pteropus poliocephalus*) (GHFF) is one of four species of flying-foxes occurring in mainland Australia and is the most abundant and widespread of flying-foxes in Victoria. The Little Red Flying-fox (*Pteropus scapulatus*) also occurs across most of Victoria; however, typically in much lower numbers and primarily in central and northern Victoria. Other species on the mainland are the Black Flying-fox (*Pteropus Alecto*) which occurs in a broad band along the coast from central New South Wales to central Western Australia, and the Spectacled Flying-fox (*Pteropus conspicillatus*), only found in northern Queensland.

The GHFF is threatened by habitat destruction, conflict with humans and infrastructure such as power lines and crop netting, climate change and heat stress. The species is listed as 'Vulnerable' under the Victorian *Flora and Fauna Guarantee Act 1988* and 'Vulnerable' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

The Australian population estimate for the GHFF is 680,000 (Westcott, Heersink, McKeown, & Caley, 2015), although this is likely to be an over-estimate following significant losses due to bushfires and heat stress events since 2015 (van der Ree, 2021). Flying-foxes are nomadic, travelling thousands of kilometres each year in response to changes in food availability. According to the *National Recovery Plan for Grey-headed Flying-fox* (Department of Agriculture, Water and the Environment, 2021 a), the species is considered to be a single, mobile population distributed across Queensland, New South Wales, Victoria, South Australia, Australian Capital Territory and Tasmania.

Flying-foxes are thought to have a maximum natural longevity of 15-20 years. The GHFF has an average life expectancy of 7.1 years (Tidemann & Nelson, 2011). They are seasonal breeders, with a single pup born each year. The majority of births occur from October to December. Females generally reach sexual maturity in their second year.

Flying-foxes are significant contributors to forest health through long-distance seed dispersal and pollination. Flying-foxes feed on fruit, nectar and pollen. They forage over extensive areas and have been known to fly as far as 50 kilometres from their camps to feed in a single night (Department of Agriculture, Water and the Environment, 2021 b).

Prior to the 1980's, there were few written records of GHFF occurring in Victoria, but the GHFF has since expanded significantly in number and distribution since 2010. At the time of writing, there were approximately 40 identified GHFF camps scattered across Victoria including eight permanent camps. New camps may form slowly, starting with a small number of GHFF. At other times or locations, they establish quickly, and the colony grows to many thousands of animals. Existing camps can also experience sporadic and rapid changes in size.

Nationally important camps for GHFF are defined as those that have contained 10,000 animals or greater in more than one year in the last ten years or have been occupied by more than 2,500 GHFF permanently

or seasonally every year for the last ten years (Department of Environment, 2015). In Victoria, nationally important GHFF camps are located at Geelong, Melbourne (Yarra Bend) and Traralgon (Department of Agriculture, Water and the Environment, 2021 a).

5.1.2 Heat Stress

Heat stress occurs in mammals when the body absorbs or produces more heat than it can dissipate resulting in a rise in core body temperature. Flying-foxes are temperate to tropical animals with a normal core body temperature ranging between 37-39°C. Flying-foxes have evolved to deal with short exposures to environmental temperatures of up to 40°C. Thermoregulatory behaviour by flying-foxes includes belly dipping in water, wing fanning, shade seeking and moving lower in canopy, followed by panting and salvia spreading.

Flying-foxes are subject to heat-stress mortality when environmental temperatures exceed approximately 38°C on single or for multiple consecutive days. The specific temperature threshold at which mortality occurs varies depending on other climatic conditions including humidity, wind speed, wind direction and cloud cover. Additionally, the number of hot days and warm nights that precede an extreme heat event, as well as the access to water and shade cover in the camp will also influence the impacts.

GHFF can die in very large numbers from heat stress. During the summer of 2019-2020, 85 flying-fox die-off events were recorded in south-east Australia with at least 72,175 flying-fox deaths (Mo et. al., 2021). At Yarra Bend in 2009 on Black Saturday, at least 4,790 GHFF died (Van der Ree, 2018). Currently, up to five flying-fox heat stress die-off events occur every year in Australia (Department of Agriculture, Water and the Environment, 2021 a). These events are expected to increase in frequency under climate change (Welbergen, Klose, Markus, & Eby, 2008).

Figure 5: Roosting grey headed flying-foxes

5.1.3 Risk Profiles

The conditions contributing to GHFF heat stress and mortality depend on a range of climatic variables primarily:

- Temperature
- The number of consecutive hot days/nights
- Wind speed and direction
- Cloud cover
- Relative humidity

Additionally, heat stress and mortality may vary from camp to camp and within camp depending on a range of factors including:

- The geographic location of the camp e.g., camps located in south-west Victoria, may be less subject to extended periods of dry heat than those in central Victoria where it is usually hotter and drier
- The habitat at the camp - open canopy is more susceptible to heat and wind exposure
- The time of year - dependent young and their mothers are particularly vulnerable early in the breeding season (November – December) due to the combined body mass of baby and mother. Adult males entering the breeding season (mid-January to late March) are also more vulnerable presumably due to increased testosterone and activity levels.

Flying-fox camp management plans should take these factors into account when considering methods for reducing the risk of heat stress events.

5.1.4 Prevention

Human activity, increasing temperatures, storms, bushfires, floods, and drought associated with climate change are likely to degrade flying-fox foraging and roosting habitat and increase heat related mortality (Department of Agriculture, Water and the Environment, 2021 a). Maintaining and/or improving the quality of habitat at flying-fox camps can improve resilience to heat stress. Research indicates that flying-foxes prefer to roost in dense vegetation close to a river or creek, with a closed canopy and complex structure – i.e., with upper, mid and understorey layers (SEQ Catchments, 2012) . Habitat improvement at camps should aim to provide:

- Understorey and mid-storey vegetation to buffer against extreme heat and drying winds
- Dense crown vegetation to provide shade
- Access to water for dipping and drinking.

Other preventative measures include the construction of artificial shade, sprinkler installation and the provision of standing water. Some camps have pre-installed sprinkler systems in place which can be turned on when needed. Camp Heat Stress Plans should identify where these are in place.

5.2 Preparedness

5.2.1 Pre-season

In the lead up to Summer, Camp Heat Stress Plans for high-risk camps should be prepared and/or updated to ensure that geographically appropriate response triggers for camp surveillance are established, local response arrangements are specified, resources are identified, and contact information is up to date (see Section 2.2). Camp Heat Stress Plans should include information on the availability and location of response equipment.

This is also the time to check the vaccination status of all personnel likely to be deployed to undertake camp surveillance and respond to heat stress events (See Section 4.1.5.1).

Pre-season flying-fox heat stress preparedness updates should be included as part of DEECA's regular fire pre-season briefings in DEECA Regions where high-risk camps occur (Loddon Mallee, Port Phillip, Gippsland). DEECA will undertake broader community engagement and media on the impact of extreme heat on flying-foxes within regions..

Public land managers should conduct pre-season updates in line with individual Camp Heat Stress Plans. These updates, delivered in conjunction with DEECA, should involve all parties detailed within the camp plan including land manager employees, relevant agency staff and accredited veterinarians and volunteers. This engagement will generally cover:

- Information on projected or identified flying-fox impacts for the coming season
- Resourcing availability and contacts
- Arrangements not already covered by Camp Heat Stress Plans
- Changes or updates to training or response procedures.

DEECA will assist private land managers with flying fox camps to undertake pre-season briefings and engagement.

Figure 6: Grey headed flying fox belly dipping in a river

5.2.2 Pre-event

Unlike other wildlife emergencies, flying-fox heat stress events can often be predicted, and the scale of the event minimised by careful surveillance of flying-fox behaviours and early intervention. As a pro-active approach, flying-fox camp surveillance and preparation activities, such as setting up triage facilities and closing public access, will be carried out under the umbrella of DEECA's emergency response arrangements (See Section 5.3.3).

When certain weather conditions are forecast, Wildlife Field Assessment Teams will be activated to ensure that flying-fox behaviours are monitored, and preparations are made for a possible event. Any signs of heat stress may then be detected and responded to as quickly as possible. Rostered RACs/DDOs will be responsible for activating camp surveillance activities when set weather triggers are forecasted in consultation with land managers and in accordance with Camp Heat Stress Plans (See Section 5.3.2).

5.3 Response Procedures

5.3.1 Principles

Although the primary goal of wildlife emergency response is to protect wildlife welfare, this must not take precedence over human safety. Personnel who insist on placing the welfare of individual animals above the welfare of the colony or the safety of response personnel will be removed from the incident.

A further key consideration is the welfare of the colony. Some intervention activities, such as spraying and removal of individual animals for treatment, can jeopardise other animals in the colony, as disturbance has the potential to cause panic and exacerbate heat stress. It is therefore critical that flying-fox heat stress response teams have a thorough understanding of flying-fox biology and behaviour.

In order to provide for both the safety of personnel and the welfare of flying-foxes, the following principles should be used to guide the approach to flying-fox heat stress response in Victoria:

- Human safety is the highest priority
- Intervention is minimised to reduce the impact of the response on the colony
- Flying-fox welfare is ensured by having veterinary and flying-fox heat stress expertise built into response teams.

5.3.2 Response triggers

Climate monitoring is carried out using weather forecasting services and either remote data loggers or in person using portable weather meters (e.g., Kestrel weather meter) set up at appropriate locations in the camp or both. The University of Melbourne, and the Bureau of Meteorology have developed a flying-fox heat stress forecaster. The forecaster predicts the camps where flying-foxes are likely to be exposed to extreme heat up to 72 hours ahead.

Camp Heat Stress Plans will provide location- specific triggers for activation of the first phase of flying-fox heat stress response including details of flying-fox heat stress surveillance and preparation activities to be undertaken for each camp.

In the absence of location-specific triggers, active camp surveillance and preparation activities should be activated when conditions meet or are likely to meet the following triggers:

- Temperatures in excess of 38°C, and
- Relative Humidity below 30 per cent.

5.3.3 Camp surveillance

Camp heat stress surveillance and preparation is activated when an extreme heat event is predicted, in line with triggers described in the Plan (Section 5.3.2 above) or Camp Heat Stress Plans. These activities will be carried out by a Wildlife Field Assessment Team/s reporting to either the Regional DEECA RAC, DDO or IC (see Section 3.9.2.2). These roles may be filled by FFMVic staff, land managers, vets, or volunteers, provided they are specified in a Camp Heat Stress Plan and/or approved by the IC or DDO. Once camp surveillance is activated, this is considered a Level 1 response.

Wildlife Field Assessment Team/s will closely monitor camp conditions and flying-fox behaviours and carry out activities necessary to prepare for an escalation in the heat stress event and to mitigate the impacts. These activities will be guided by arrangements set out in Camp Heat Stress Plans. Wildlife Field Assessment Team/s must include personnel with knowledge and experience with flying-fox heat stress behaviours (See Sections 3.9.2.2 and 4.3).

Camp surveillance activities include the following:

- Observation of flying-fox behaviour to watch for signs of heat stress using remote camera technology or by carrying out regular site visits or both. Note that behaviour monitoring must be carried out by personnel trained and experienced with flying-fox heat stress behaviours as it is

critical not to disturb the colony during periods of potential heat stress. The frequency of site visits will depend on the camp and should be specified in the Camp Heat Stress Plan for the site.

- Closing off public access to camps to prevent disturbance to flying-foxes
- Preparing for and carrying out cooling activities such as spraying and misting
- Liaising with veterinarians and local volunteers about availability of resources in case heat stress behaviours start to become evident in the colony.
- Setting up basic field triage units in accordance with Camp Heat Stress Plans.
- Advising DDO/IC of need to activate Level 2 response when signs of heat stress are detected (see Section. 5.3.4 below for intervention guidance).

Weather and behaviour observations to be recorded as per Section 5.3.8.

5.3.4 Intervention guidelines

Decisions on how and when to act during a flying-fox heat stress event should be guided by the behaviour of the flying-foxes themselves. During times of extreme heat, it is normal for flying-foxes to adjust their behaviours to cool themselves. They do this by water dipping, wing fanning, wrist licking and moving lower down in the canopy. As far as possible, flying-foxes should be left alone to manage this themselves as interference, particularly at the wrong time can cause additional stress and exacerbate the problem.

To ensure that there is minimal disturbance, particularly during the early stages of a heat stress event, it is important that response teams include personnel trained and experienced with assessing flying-fox heat stress behaviours (see Section 4.3).

The following guidance on the stages of heat stress is provided to assist with decision making for Wildlife Field Assessment Teams. Note that different parts of the colony may display the different stages of heat stress behaviours at different times. Further guidance will be provided in training and Camp Heat Stress Plans may provide more detailed guidance.

Table 4: Flying-fox heat stress stages and appropriate intervention responses

Stage	Behaviour	Response
Surveillance and set up	Fanning, wrist licking, water dipping, moving down canopy	Do not approach. Continue surveillance from a distance.
Cooling	Clustering and clumping low to or on ground	May carry out spraying and/or misting provided animals do not lift off.
Triaging	Unresponsive	May collect individuals for treatment provided others do not startle and/or lift off

Figure 7: Grey headed flying foxes clumping during a heat stress event

5.3.5 Intervention procedures

5.3.5.1 Spraying and misting

If flying-foxes are not able to effectively cool themselves and are starting to show signs of distress; clustering and clumping low to or on the ground, Wildlife Field Assessment Teams may carry out intervention cooling techniques such as misting and/or spraying with water, provided this does not cause them to lift off. Water spray should not be too cold. Pressure spray should always be directed above flying-foxes and allowed to fall downwards onto them rather than directly at them. Ideally pressure spraying should be done from a distance and from the edges of the colony to minimise disturbance. If fire hoses are being used for spraying, vehicles and motorised pumps should be kept as far away as possible to keep noise disturbance to a minimum. Hand pumps may be used to spray individuals or clusters, but personnel must keep at least one to two metres away from flying-foxes. Note that pre-installed water sprinklers and misters are available at some camps, and these may be activated prior to clustering and clumping in accordance with Camp Heat Stress Plans.

If flying-foxes reach the stage where they become unresponsive on the ground, they will need to be taken to an onsite triage facility for fluid therapy and cooling. Spraying with water may be used to assist with separating clusters of flying-foxes to allow responders to gain access to unresponsive animals. Using this technique, responsive animals can be encouraged to move away or climb onto sticks. This should be done with great care to prevent responsive animals from becoming more stressed.

Figure 8: Cooling flying foxes during a heat event via manual spraying

5.3.5.2 Collection, handling, and transport

Flying-foxes will attempt to bite and hook onto the handler with the claws on their thumbs and feet if they are alert. If collecting alert but injured flying-foxes for transport, the wings should be restrained by gently folding them against the body and a towel used to hold them. Flying-foxes should then be placed in pet carriers with provision for them to hang from their feet if they are able. Note that the use of appropriate PPE is mandatory for handling of flying-foxes, see Section 4.1.9.

Un-responsive flying-foxes suffering from heat stress and requiring rehydration will be unable to hang and should be placed in pet carriers on damp towels or carried in damp handling bags such as pillowcases. **Unresponsive flying-foxes should not be wrapped**. If they are unable to hang, or where hanging is not advisable (such as suspected head injury) flying-foxes should be laid down on damp towels at a 45-degree angle with their feet elevated in a small pet carrier.

Dependent young may become separated from their mothers during heat stress events. Dependent young requiring rehydration should be clearly identified on transport packs, and their precise location recorded to facilitate reunification of mother and young after treatment. Dependent young may be transported together.

All animals taken to triage for treatment should be marked to denote capture location using the techniques defined in individual Camp Heat Stress Plans. Transport distances of flying-foxes must be kept to a minimum and vehicles must be airconditioned.

Figure 9: Alert flying-fox in cage ready for transport

5.3.5.3 Triage and treatment

Once a triage facility is established, veterinary teams will be available onsite to carry out individual animal assessments and any necessary treatment. All invasive procedures and euthanasia will be carried out by qualified registered veterinarians in accordance with approved veterinary protocols.

Non-invasive procedures such as oral rehydration may be carried out by veterinary nurses, triage assistants and volunteers under the supervision of veterinarians. Most flying-foxes will respond well to rehydration and cooling under artificial shade or in an airconditioned facility. If animals don't respond to initial supportive care, blood tests may be required to determine the severity of systemic damage, and overnight care will be necessary, with the possibility of either release the following day or euthanasia.

Following treatment at the on-site triage facility, flying-foxes should be returned for release as soon as possible to their original point of capture. Release should be carried out during the coolest times of the day – i.e., late afternoon or early morning.

Dependent young that have become separated from their mothers should be monitored closely for re-unification. Re-unification usually occurs at the end of the day. Young that have been returned to the colony will need to be checked on subsequent days to ensure re-unification has been successful. If re-unification is un-successful, orphaned dependent young will need to be taken into longer term care for rehabilitation (see section 5.3.5.4). Further information on re-unification will be provided in training (see Section 4.3).

Figure 10: Oral rehydration in triage

5.3.5.4 Rehabilitation and release

Long-term care (greater than 2-3 days) must be undertaken by licensed wildlife carers in accordance with guidelines for wildlife rehabilitation set out by DEECA.

Rehabilitated flying-foxes must undergo soft release. Soft release can be carried out at existing soft release facilities at Yarra Bend. However, there is no mandatory requirement to use the Yarra bend facility. Soft release can occur at or near other camp locations closer to the site of rehabilitation. Transport of animals over long distances is discouraged. If it must occur, it must be done with appropriate consideration of the welfare of the animal.

All rehabilitated flying-foxes must be released in accordance with the *Wildlife Shelter and Foster Carers Authorisation Guide*. If the site no longer provides sufficient food, water or shelter for the animal, the animal can be released at a nearby location within its home range. In cases where this is not possible or in cases when the release is unsuccessful, the animal must be euthanised as per the Authorisation Guide.

5.3.6 Access to private land

Access to private land requires landowner approval. If land-owner approval is not able to be obtained, entry to private property to directly assess injured wildlife can be undertaken by an authorised officer appointed as a Prevention of Cruelty to Animals Inspector under section 18 of the *Prevention of Cruelty to Animals Act 1986* (POCTA).

Private property access arrangements should be pre-defined in Camp Heat Stress Plans. Where required, the IMT will deploy authorised officers to the incident to assist with managing access issues. DEECA will work with private landowners in the development of access provisions in Camp Heat Stress Plans.

5.3.7 Carcass disposal

As part of the incident response and before stand-down occurs, the camp must be thoroughly checked, and all dead flying-foxes removed and disposed of appropriately. Disposal of carcasses must be carried out at licensed Environment Protection Authority (EPA) approved animal waste facilities and identified in Camp Heat Stress Plans.

5.3.8 Incident and animal records

DEECA requires records to be kept for every flying-fox heat stress event where surveillance and intervention occurs. There are three record Camp Surveillance Records containing environmental and behavioural observations of the camp, Individual Animal Records for those animals taken into triage, and Incident Summary records that provide an overview of the incident and number of animals impacted. Details of the data recorded are shown in Table Four. DEECA is currently investigating options for electronic data recording systems, see Section 4.4.2.

Table 4: Incident Records and data fields

Camp Surveillance Record	Individual Animal Records	Incident Summary Records
• Incident Number • Team Member Name • Camp • Date • Time • Temp • Humidity • Cloud Cover percentage • Wind speed and direction • Flying-fox behaviour category • General information e.g., sprinklers activated, triage set up etc	• Incident Number • Animal Record Number • Team Member Name • Collection date & time • Collection location - GPS • Weight • Sex • Age • Treatment • Release date • Release location • Transferred to long-term care date • Carer details	• Incident Number • • Number triaged • Number released • Number orphaned/taken into long term care • Number euthanised • Number deceased

5.3.9 Stand Down

Deactivation of the incident and stand down of personnel occurs when the IC determines. If field activities are being carried out, including surveillance, pack-up and carcass disposal, the IMT will remain in place. This is essential to ensure DEECA fulfils its wildlife welfare and incident management responsibilities and provides for the safe an effective deployment, management, and deactivation of FFMVic personnel, contractors, and volunteers. Long term care of flying-foxes at authorised wildlife shelters is considered part of Business as Usual (BAU) activity and does not require IMT.

6. Communications

6.1 Public Communications

For any emergency the provision of timely and accurate information to the community is critical. Dissemination of information to the wider community is important to the success of wildlife response operations as it may assist with:

- Information gathering to support the response
- Obtaining assistance from the public
- Managing the safety of community members and responders
- The media and public response to the incident.

The public and the media should receive accurate and timely information on wildlife response operations. Information supplied to the media and to the public should include:

- The roles of the various agencies involved and number of personnel participating
- What steps are being taken to protect wildlife
- What the public can do to help including information on heat affected flying-foxes to DEECA via the electronic app or by phone. See section 4.4.1
- The risks of handling wildlife to people who are not officially deployed to discourage this from happening.

6.2 Incident Management Team Communications

The IMT is responsible for collecting relevant incident information and providing updates and briefings to the public and other agencies and organisations involved, as requested by the IC.

The IMT will handle all media queries and communication materials relating to impacted wildlife and the response. In addition to media releases and interviews, information can be provided in the form of fact sheets, maps, brochures, photos and signs.

During a heat stress event, the Planning Officer will be the contact point for local wildlife volunteers and rehabilitators.

6.3 State-wide Communications

Flying-fox heat stress events are localised in nature, therefore, most communication will occur at the incident or regional level. Where required messaging will occur through the SCC. Generic advice for the public on what to do if they see injured wildlife will be circulated with incident warnings through the State level communication channels, including the VicEmergency app and social media. The provision of this information will be supported, and fact checked by the POWE or SDO (Wildlife Emergencies).

7. Continuous Improvement

DEECA is committed to reviewing activities and identifying ways to continuously improve how it responds to wildlife emergencies. Continuous improvement occurs through reviewing past performance, understanding key issues or circumstances that may have led to an outcome, seeking input and feedback from participants and reviewing the outcomes of the response process. All review activities will be undertaken in line with DEECA and Emergency Management Victoria requirements.

As this is a new plan, it will remain in draft over the 2021/22 season. All flying-fox preparedness and response activities should be guided by the information retained within the Plan. Where IMT and responders identify issues, conflicts, or areas for improvement, this should be documented by the DEECA Region and provided to the POWE. This information will then be considered as needed over the summer and in the end of season review. Following this, the Plan will be revised and updated as required. It will then be submitted for endorsement.

7.1 Incident Debriefs

At the end of each shift, and before standing down personnel, it is important to hold a 'hot debrief' on site to ensure that all operational personnel (including volunteers) can provide immediate feedback on incident management. This must be led by the relevant team leader, with feedback passed back into the IMT to allow modification or improvement of any operational activity.

A formal incident debrief or After Action Review (AAR) should also be conducted involving the wider IMT. This is usually undertaken days or weeks after the event by the Lead Agency. Debriefing should focus on assessing operational objectives, performance, and success as well as safety, communications, costs and recommendations.

Both the 'hot debrief' and the formal debrief, or AAR will be recorded, so that outcomes and learning can be formally documented. Debriefing is the responsibility of the IC.

7.2 Veterinary team debriefs

At the conclusion of each season, a formal debrief will be held with accredited veterinary staff who were deployed through the season to discuss and identify issues and improvements in wildlife assessment and treatment. This will involve an outcomes-based review of wildlife veterinary records.

Information gathered from this debrief will be incorporated into veterinary guidance manuals and training.

7.3 End of Season reporting

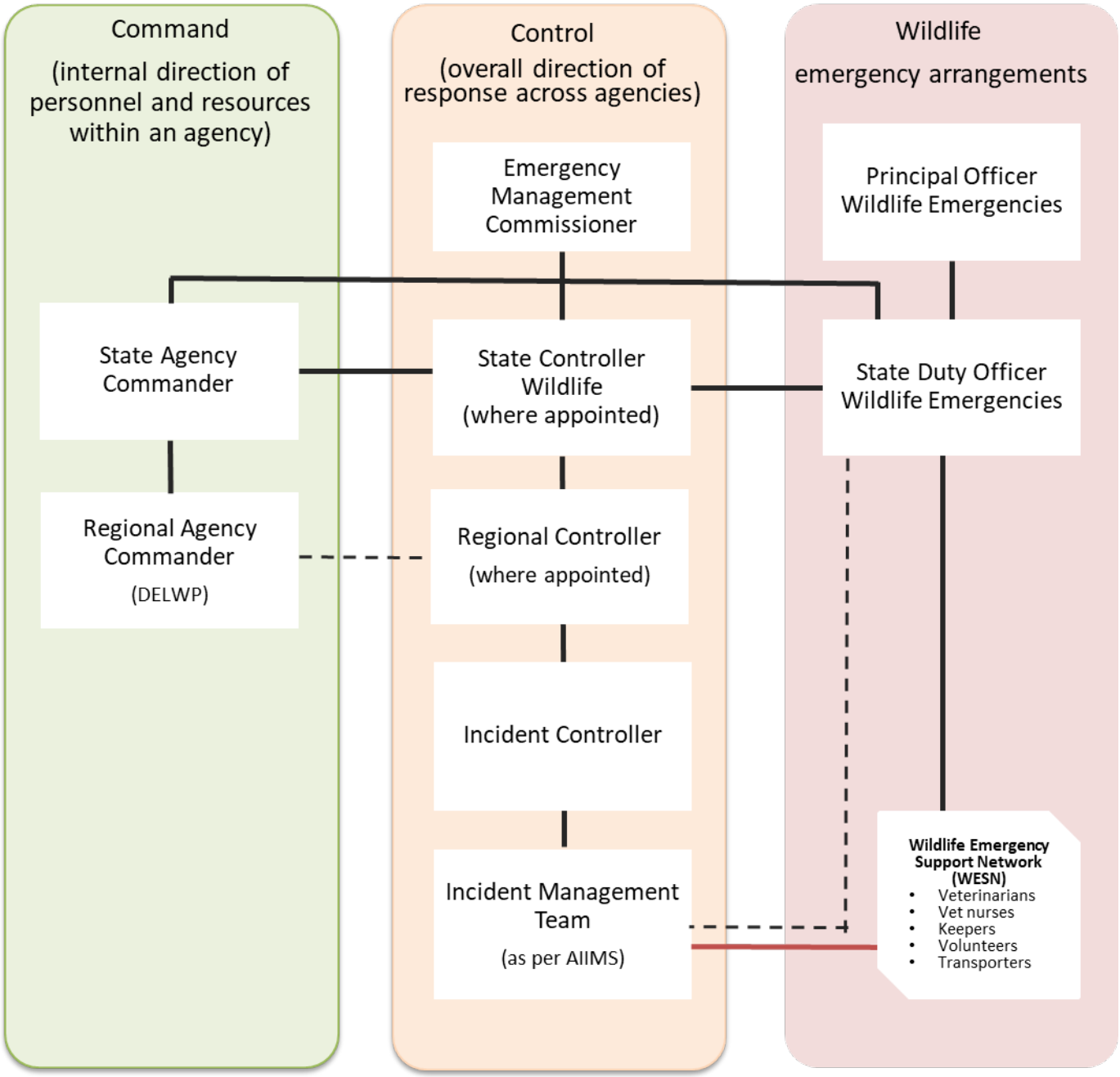
At the end of the 2021/22 season, DEECA will produce a short summary of heat stress response activities it led for the wider community. The report may include information on the:

- Count of animals assessed, triaged, euthanised, rehabilitated and released
- Scale and location of wildlife response activities undertaken
- Frequency and types of welfare concerns or injuries identified.

Individual case studies of specific incidents or interventions may also be included.

8. Appendices

8.1 Appendix 1: Command and Control arrangements for wildlife and fire emergencies



8.2 Appendix 2. Camp Heat Stress Plan template

Contents

Flying-fox Camp Heat Stress Plans

This document is designed to assist land managers in the preparation of Camp Heat Stress Plans which are required by the Victorian Response Plan for Heat Stress in Flying-foxes (the Plan). Camp Heat Stress Plans are the local readiness and response plans for heat stress events at flying-fox camps. These sit under and align with the Plan.

The following list of contents can be used as a template for Camp Heat Stress Plans. This template provides a list of contents which is intended to be used as a guide and is not intended to be exhaustive. Additional information may be included if response arrangements align with the Plan. Information should not be duplicated from the Plan.

1. Background on camp:
    a. Land status, landowner/land manager/traditional owners/traditional country
    b. Flying-fox camp information including:
        i. Flying-fox numbers current and historically,
        ii. Location,
        iii. Vegetation structure, habitat,
        iv. Map, vehicle access, closure to public and water point information, amenities
        v. etc
    c. Local risk context:
        i. Heat stress history,
        ii. Standing water availability,
        iii. Sprinkler infrastructure
        iv. etc
2. Scope of the Camp Heat Stress Plan
    What it covers/doesn't cover, including relationship to the Plan and other Victorian documents such as veterinary protocols and rehabilitation guidelines.
    Note that a local Camp Heat Stress Plan is different to a camp management plan. However, a camp management plan may contain local Camp Heat Stress Plan readiness and response arrangements for that camp.
3. Roles and responsibilities:
    a. Organisational responsibilities and accountabilities
    b. Local partnership arrangements e.g., Local carers, wildlife groups or vets, Zoos Victoria, Friends of Bats & Bushcare, Wildlife Victoria, other
    c. Model of cover for the camp (to be aligned with state-wide model of cover)
    d. Roles: role statements will be provided by DEECA during training
    e. Response structures populated with names of local resources.
    f. Contact arrangements
    g. Expected behaviours
4. Pre-season preparedness activities and responsibilities (winter/spring)

a. Liaison with partners and stakeholders including volunteers
b. Training and accreditations in place
c. Vaccination checks
d. Safety documentation in place and up to date
e. Equipment checks:
    i. Sprinkler set-up/maintenance
    ii. Triage equipment, where stored, what needs replacing/servicing, how to replace
    iii. Transport equipment, where stored, what needs replacing, cleaning etc
    iv. Location of important documents such as Safe Operating Instructions Safe Work Procedures, Job Safety Plans, etc
    v. Location of keys for trailers, bollards etc
    vi. Details of suppliers
f. Preseason briefings (lead by land manager)

5. Response arrangements – *must be aligned with the Plan*
    a. Level 1/camp surveillance arrangements (in accordance with Section 4 above and Section 5.3.3 of the Plan).
        i. Weather monitoring - who/how
        ii. Environmental triggers for initiating Level 1 response if different to triggers in state-wide plan e.g., 2 or more consecutive days above 38/40/42 °C
        iii. Establish DEECA emergency notification arrangements e.g., RAC, DDO
        iv. Vet and volunteer resource requests/deployment arrangements (e.g., can be via DEECA/WESN/Wildlife Victoria/direct contact)
        v. Triage set-up arrangements
        vi. Details of Level 1 activities to be undertaken in accordance with Section 4 of the Plan, including surveillance, triage set-up, camp closure, advisory sign installation etc
        vii. Shift arrangements
        viii. Meal arrangements
    b. Camp specific arrangements for Level 2 and Level 3 response
        i. Process for escalation to Level 2 response (*provided aligned with the Plan*),
        ii. Guidelines for intervention activities misting & spraying methods e.g., by hand/fire trucks etc
        iii. Clean-up and carcass disposal arrangements
6. Contacts: lists of local accredited responders and roles they fill
7. Local Equipment
8. Appendices e.g., safety documentation, other plans

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