University of Southern Queensland

AEC Standard Operating Procedure

Recovery of GPS tags from injured individuals & cadavers (raptors)

UniSQ AEC SOP ID: RMT008

This Standard Operating Procedure (SOP) is applicable to all UniSQ Research Workers who care for and use Animals for Scientific Purposes. The procedure must only be performed by those persons who have been deemed competent, and who believe they remain competent to do so. Access to supervision by suitably qualified staff whilst undertaking this procedure is encouraged, where required.

Species

- Wedge-tailed eagle (*Aquila audax*)
- White-bellied Sea Eagle (*Haliaeetus leucogaster*)
- Little Eagle (*Hieraaetus morphnoides*)
- Other eagle species

Purpose

This procedure was written as part of a suite of SOPs for the assessment of various raptor monitoring techniques. Population surveys and monitoring play a key component to many ecological research projects and are an important conservation tool. However, raptor monitoring is time consuming and expensive, resulting in a decline of monitoring raptor species in Australia. The project looks to optimise raptor monitoring by determining the efficacy of various monitoring technologies and techniques available to wildlife conservation. It is important to use traditional methods in concurrence with these novel methods to provide a baseline to compare against.

The purpose of this procedure is to recover GPS tracking equipment, assist injured birds and/or recover cadavers. Due to the risks of possible zoonotic disease transmission and aggressive injured birds, this procedure **must only be completed** by trained personnel.

The circumstances encountered will dictate what will actions be required and each circumstance has been detailed in the procedure.

Definitions	
Eagle	In this SOP can refer to any of the three eagle species listed, or other species.
Vertebrate	Any species of animal that has a vertebrate skeleton, i.e. mammals, reptiles, amphibians, birds and fish.
Post mortem	The period after the animal has died.
Necropsy	A post mortem examination to discover the cause of death or the extent of disease, or the trauma or injury that lead to death of the animal.
Euthanasia	The practice of intentionally ending an animal's life to relieve pain and suffering.

Linked SOPs	
SOP ID number	**SOP title**
RMT006	Baited camera station survey

Potential hazard to Research Workers	
UniSQ Risk Management Plan ID number	**UniSQ Management Plan title**
RMP_2020_4960	Wildlife research and teaching fieldwork

Personal Protective equipment required

- Disposable examination gloves
- Thick leather falconry/welding gloves
- Eye protection
- Mask

- Hiking boots
- Appropriate clothing and change of clothing
- Spare shoes

Animal wellbeing considerations	
Perceived stressors	**Management strategy**
Animal pain	A common reason why an animal requires euthanising is pain. This may be from disease, injury, birth or starvation. If it is not possible and/or practical for the animal to be treated and recover, euthanasia may be the most ethical course of action. The method of euthanasia should minimise the pain experienced by the animal while it dies. This must be balanced by the pain it is experiencing whilst still alive and waiting to be killed. Personnel should make a judgement on the most appropriate euthanasia method based on equipment availability, method efficacy, the pain/stress the animal is and will experience and how long the process will be. Is the animal likely to attack and injure handlers? If so, conduct full risk assessment for handling and transporting animal beforehand if possible (i.e. plan worst case scenario based on the species that may be encountered). Note: however that raptors may express pain by a number of contradictory responses i.e. they may become agitated or completely passive; they may seem unable to settle or commence grooming behaviour.
Animal stress while handling	The best way to minimise the risk of a raptor biting or scratching is to avoid handling if possible. If the raptor must be handled, minimise time spent handling, handle firmly and quietly, and minimise stressors in the vicinity (e.g. number of people, loud noises, bright lights, vibrations). Avoid putting hands or other body parts within biting/scratching distance of the raptor. Restrict the animals head and limbs safely to minimise the chance of being bitten or scratched. Is the raptor likely to attack and injure handlers? If so, conduct a full risk assessment for handling and transporting the raptor beforehand if possible (i.e. plan worst case scenario based on the species that may be encountered).
Nest disturbance of breeding raptors	Disturbance of nests of breeding diurnal raptors will be minimised by maintaining an appropriate distance to any nests, this will be achieved by: 1) Use of high zoom camera to record nest and individual bird images 2) Use of phone app to record nest height In addition, the time spent near the nest will be minimised by efficient data entry. This will be completed using the CyberTracker wildlife monitoring app (or similar). Persons engaged GPS tag recovery will be advised on the importance of minimising noise and physical movements in the vicinity of nesting raptors.
Initiation of territorial behaviour (raptors)	In the case of a raptor displaying **unexpected** territorial behaviour (screams, diving, visual displays) to personnel, leave the area as soon as practically possible. Should the bird cause injury, the team should still vacate the area and then administer any required first aid and/or visit hospital as required.
Initiation of territorial behaviour (e.g. magpies, butcher birds and plovers)	Territorial behaviour from these bird species is expected between September and November. Engagement from these species is less likely when two people are present, and this will be the case for most of the on-foot surveying. Should the personnel begin to be swooped by any of these species, if possible, eye contact should be maintained with the bird whilst the survey team vacate the area. A stick may be waved as a deterrent, but must not be used to strike any birds. Should the bird cause injury, the team should still vacate the area and then administer any required first aid or visit hospital as required.

Snake encounter	Upon encountering a snake, personnel are to remain still until the snake has moved away. The exception to this is with python species and death adders, which are both more likely to remain *in situ*. In this case, personnel should back away slowly from the snake and if required find an alternative route. Personnel will be trained in the basic identification of these species. Personnel will also be taught the first aid skills required should a person be bitten by a snake, and will carry a snake bandage within the first aid kit at all times. Should the snake bite, the team should vacate the immediate area of the snake, administer first aid and call an ambulance to the location.
Capture myopathy	Minimise stress through: use of blindfold – i.e. towel/blanket (less observation by animal of handler), minimise capture time, quiet confident handling, minimise handling, application of tranquiliser if required, maintaining appropriate temperatures. Is the animal likely to attack and injure handlers? If so, conduct full risk assessment for handling and transporting species.
Entry into enclosure	Minimise the stress through: removal of objects in enclosure that may get in the way of entry/exit, knowing the biology of the species being moved (does it avoid or embrace dark confined spaces), design/modify enclosure based around the species. Provide a comfortable environment for the raptor. Minimise handling and handle raptor quietly. Minimise distractions and stressors in the vicinity of the enclosure (e.g. number of people, loud noises, bright lights, vibrations). Is the raptor likely to attack and injure handlers? If so, conduct full risk assessment for handling and transporting species.
Stress in container	Minimise stress through: use of container coverings, minimise time in container, quiet minimal handling of container, maintaining appropriate temperatures. Effective enclosure design is vital, with space for raptor to be comfortable whilst not allowing too much space for movement. Raptor should be easy to get in and out of container to minimise handling stress. Physical restraints should still allow movement so as not to cause injuries from movement in container. Minimise stressors in the vicinity of the container (e.g. number of people, loud noises, bright lights, vibrations). When using vehicular transport, secure container, making sure it cannot slide, fall or jump around inside the vehicle. Minimise speed when turning vehicle and try to avoid rough terrain wherever possible, minimising speed over such terrain when it is required to traverse. Only put the appropriate number of animals in each container (keep solitary animals by themselves, social animals may travel better with others). Don't put containers close together with raptors that may compete with or harm each other (e.g. territorial animals, breeding males, predators).

The overall perceived level of risk to an animal undergoing this procedure is:

☐ High ☐ Medium ☒ Low

Substances to be administered			
Substance	**Dose**	**Route**	**Purpose**
Not applicable			

Equipment/ materials required

- Survey 4WD vehicle
- Sealable freezer bags – extra-large size (designed for large meat joints)
- Vehicle fridge/freezer
- Euthanasia equipment kit
- Bird container

- Tie downs and ratchet straps
- Large towel
- Duct tape
- Marker pen
- Blank examination tags
- Radio tracking gear (if possible)
- Mobile phone with topographical map app (last known location uploaded) and CyberTracker app
- Alcoholic hand sanitiser
- Biohazard disposal bin liner
- Lone-working alarm system
- Long range zoom digital camera with neck carry strap
- Spare batteries and memory cards for the camera
- Camera case for transport
- Two small portable rechargeable Bluetooth speakers (optional)

Site specification or location requirements

At locations/ fields outlined within a UniSQ AEC approved application that includes the use of this SOP.

Procedure

1. Accessing last known location

- Using data from the GPS tracking unit of the individual you are looking for, navigate to the last known location using a mobile phone. This information will be stored in the tracking database. Before navigating to location:
    1. Identify how far away the tracker is and whether it is possible to reach it during daylight hours. If not leave until the following day, it is too dangerous to conduct this procedure at night.
    2. Plan a route to the tracker.
    3. It is likely that the location will require hiking to access.
- If the tracking unit is on private land, permission must be sought from the landowner before accessing it.
- If the tracking unit is on protected public land (i.e. National Park), permission to access must be gained from the state government if area is restricted, a list of contacts is available from the project leader. If the area is accessible from publicly accessible trails, retrieve as soon as possible whilst informing state government of your intention via phone or email.
- If tracking unit is on non-protected public land, retrieve as soon as possible.
- Carry euthanasia equipment, freezer bags, towel, radio tracking gear and any other handling gear in a backpack with other gear that would be taken if conducting a pedestrian survey of raptors. If possible, take second person to assist with procedure and help carry equipment.

2. Searching for GPS tracking unit

- Once in the vicinity of the last known GPS location, search the immediate ground area for the GPS tracking unit.
- If the individual eagle or tracking unit is not obviously in this are then:
    1. If it is from a Little Eagle individual, use the call out method from the last known location to see if a territorial response can be triggered in the individual. If the individual responds and a positive visual ID is gained from the leg bands, record that GPS has malfunctioned but still attached to healthy individual if it is still visibly attached to the individual. If not visibly attached, record that tracking unit has been dropped and is not retrievable, but individual is healthy. Attempt to follow the individual back to a nest site if it responds to the call-out method. Search in vicinity of nest site if the GPS unit has been dropped. Record details of nest as per method in raptor surveys on CyberTracker app.
       If the individual raptor does not appear record in the project files that GPS has stopped transmission and status of tracking unit and individual is unknown.
    2. If it is from a Wedge-tailed eagle or White-bellied Sea Eagle, use the radio frequency tracking receiver to pinpoint location. Radio frequency gear will be used with these species as they are heavier and the additional weight of the receiver will not impact them. If no signal is found, follow the above procedure for the Little Eagles.

3. If unit has stopped working but is still attached to individual

- Record that unit has malfunctioned but is still attached to a healthy individual.

- It is extremely unlikely that it will be possible to retrieve this device unless it starts transmitting again in the future (this is possible if solar charging of GPS tracking unit is deficient).
- If possible, record the location and details of any nest site used by the individual.

4. If unit has been dropped by individual

- Follow instructions in Section 3 of this procedure
- Record outcome if the unit has been retrieved or not.
- If retrieved retrieved and still functional, clean, take the GPS tracking unit back to equipment stores and reuse in the future. The message transmissions will need to be stopped in the GPS tracking unit and on the Icarus message server.
- If retrieved and not functional, assess if the GPS tracking unit can be repaired. If not, keep in equipment store for spares.

5. If an individual is injured

- If, upon reaching the last known location and/or following previous tracking instructions, you come across an injured individual access:
    1. Is the individual mortally wounded? Be extremely careful in restraining the individual, using falconry leather gloves and a towel. Injured eagles are dangerous and should not be underestimated. Blunt force trauma should be used to euthanise the animal (too large for cervical dislocation, veterinarian unlikely to be on-site for injection of barbiturates; use of firearms not appropriate). This is to be completed by restraining the animal and delivering a hard, sharp blow to the base of the back of the skull with a blunt metal or heavy wooden bar. If following the implementation of this technique it is unclear if the animal is still alive, decapitation should be undertaken to ensure death. **Only trained and confident individuals can perform this part of the procedure**. Do not perform this procedure in view of the general public, as this may cause distress to members of the public and the animal itself. Remove tracking unit and recover cadaver as per Section 3.6 and SOP *VPM008 - Transport, handling & storage of animal cadavers*. Record GPS tracking unit has been recovered but individual eagle fatally injured.
    2. Is the individual treatable? If so, using extreme care, restrain the individual using falconry leather gloves and large towel. Injured eagles are dangerous and can not be underestimated. **Only trained and confident individuals can perform this part of the procedure**. Keep head covered with towel, but ensure breathing is not restricted. Tape feet together using duct tape, covering talons with foam, and secure towel to ensure it doesn't unravel using the tape. Eagles have powerful feet with large talons and will use them to resist restraint. Carry individual back to vehicle, ensure individual is not carried or left upside down, keep restrained, secure in container and take to nearest wildlife veterinary hospital. Ask hospital staff to retrieve GPS tracking device. Record that tracking device was recovered, however bird was injured and required treatment. Maintain contact with hospital to identify final outcome, i.e. if bird ends up back at a rehabilitation facility or dies. Record this information.

6. If an individual is deceased

- If upon finding the individual and GPS tracker and you find the individual deceased, first carefully check vitals that animal is in fact deceased. Use disposable examination gloves, eye protection and mask.
- If deceased, remove GPS tracking unit.
- If body has not decomposed, place cadaver in sealable freezer bag. Seal and triple bag using more freezer bags, sealing each layer. Put individuals details, location, and your own details on blank necropsy tag using permanent marker pen, attach to freezer bags using tape. Record that GPS unit was retrieved, individual was deceased and cadaver retrieved for necropsy.
- If body has If body has decomposed, leave *in situ*. Record that GPS unit was retrieved, individual was deceased and cadaver decomposed, left *in situ*.
- Carry cadaver back to vehicle and place in vehicle fridge/freezer. If necropsy will not be done later that day start freezing, if it will be done later that day then chill and immediately take back to UniSQ facilities. Put frozen cadaver in project freezer in UniSQ wildlife facility.

7. Necropsy

- Necropsies must be conducted by a veterinarian or a suitably trained person.
- If possible, conduct a necropsy on the same day as cadaver retrieval.
  If not possible, freeze and defrost the cadaver for necropsy when facilities and time are available to conduct.
- Conduct necropsy

- Dispose of a cadaver as per the *Disposal of cadavers* procedure
- Once the necropsy is complete, send the necropsy report to the Environment Department of whichever state government where the bird was found. This is a condition of the wildlife permit and is an essential task.

Training, qualifications or competencies required

Researchers with relevant experience or qualifications can only undertake this SOP to complete the procedures required.
Student researchers must receive appropriate training and supervision from UniSQ research supervisors or qualified individuals prior to undertaking the procedures.

References

Chapman,T., Sims, C. and Mawson, P. 2011, *Standard operating procedure: Humane killing of animals under field conditions to wildlife management.* The Government of Western Australia: Department of Parks and Wildlife.

Payne, S. 2007, 'The handling of sick and injured large wild birds of prey.' *National Wildlife Rehabilitation Conference Proceedings,* Freemantle, Western Australia.

Licences and permits

Any required licences and/or permits to undertake the procedure(s) under this SOP must be obtained before undertaking this SOP.

SOP approval and review history

Date	Version	Review Pathway	Notes
17 May 2021	0.0	**18/02/2021** UniSQ AEC "Subject to Modifications." **17/05/2021** Reviewed and approved by the UniSQ AEC Executive.	N/A
23 June 2021	0.1	**23/06/2021** Wording added to "Licences and Permits": "*Any required licences and/or permits to undertake the procedure(s) under this SOP must be obtained before undertaking this SOP*."	N/A