Drones and Animal Welfare

Queensland University of Technology

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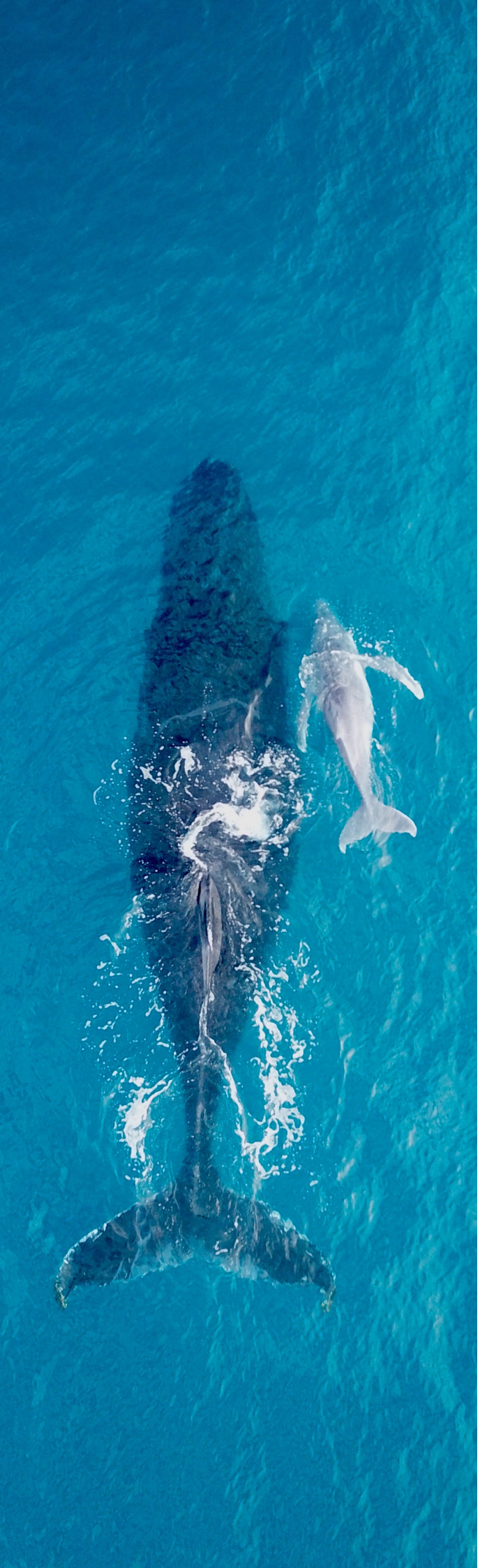

Introduction

Drones are a helpful research tool. They can capture otherwise unobtainable information, provide more precise data than land or marine surveys[1], increase human safety, and decrease operational costs. Drone technology, however, can have undesirable and unforeseen impacts on wildlife, the risks of which we currently have little understanding[2].

This guidance document aims to facilitate the ethical use of drones in research, taking into account the possible impact on animal welfare. It outlines strategies to employ and questions you should ask – to ensure that your use of drones minimises any potential risks to wildlife, irrespective of the nature of the research.

Note, this document uses the term “drones” broadly to include Unmanned Aerial Vehicles (UAV), Unmanned Marine Vehicles (Unmanned Underwater Vehicles (UUV) & Unmanned Surface Vehicles (USV)), and Unmanned Ground Vehicles (UGV).

Intuitively, drones provide a mechanism to observe animals without the need for human interaction or proximity, and therefore an apparently promising method to conduct research on animals in an ethical way. However, there is growing evidence that drone use can adversely affect the welfare of animals. Some of these findings are not immediately obvious and deserve careful consideration regardless of whether or not your research directly targets animals (e.g. conducting vegetation surveys).

For example:

- The presence of drones has the potential to be stressful for some species
- The negative effects can range from mortality by collision to stress-related decreases in productivity
- The effect on animals can depend on many factors, including the method of approach, the flight pattern, the noise, the altitude, the season, etc[3].

Unlike some other forms of animal research where it is clear which animals will be impacted by the research, the use of drones in natural habitats can inadvertently affect animals that are not the targets of the proposed research. Research that uses drones therefore requires that you think broadly about the environments in which the drones will operate.

When using drones the response of animals in the area should be monitored by a ‘spotter’ and any findings recorded and reported where possible. Drone operation should be ceased or modified if wildlife disturbance occurs[4].

Considerations

This section provides sample questions to provoke thought about your use of drones in specific contexts and habitats. It is by no means an exhaustive list, and you may need to seek advice from experts about species and habitats.

Species:

What species inhabit the area? Consideration should be given to all aerial (birds), arboreal (tree-dwelling), terrestrial and aquatic species. Particular attention should be paid to any known endangered animals.

Species activity:

What times are these species most active (e.g. are they nocturnal, diurnal or most active at twilight)? Can these times be avoided to minimise the impacts of the drone?

Reproduction:

Are there any breeding or reproductive seasons to consider? Avoid known breeding times wherever possible. Are there likely to be any burrows/nests, lactating females or young in the vicinity that might be impacted by the drone? Can your flight plan be designed so that waypoints and turns can be performed away from nesting colonies?[5]

Territorial space:

Are there any species that may be stressed by the drone operating in their territorial space? Could the drone be perceived as a predator or prey? Eagles are prone to attack drones – causing injury to the bird and damage to the drone[6].

Movement pattern:

How will animals react to the movement of the drone? Launch and recovery sites should be away from animals[7] (out of sight if possible) and potentially threatening approach trajectories and sporadic movements should be avoided.[2] Avoid steering the drone directly towards an animal as it may mimic predatory behaviour e.g. it is recommend that UAV flight paths should allow target bird species time to observe the UAV in flight outside of the colony boundaries or habitat area, therefore allowing the UAV to be assessed as a non-threat or allowing birds to habituate to its presence[5].

Can you avoid flying during thermal winds? Eagles, for example, tend to soar with thermal currents.

For UUVs, do the propellors disrupt the water flow in sensitive aquatic environments and, if so, what impact could this have on the aquatic life?

Consider how the shadow of the vehicle will impact on the animals' behaviour as well as the drone itself, as the shadow may also be a source of stress.

Altitude:

What is the highest altitude at which the drone can capture quality data of sufficient quality? Flying at a lower altitude may increase stress on animals due to proximity. Sensors should be optimised (e.g. focal length) to enable collection of suitable data from a drone operated, typically, as high or as far as possible from the subjects.[2]

Noise:

How will the noise of the drone impact animals in the area? Can the noise be reduced? Note that different species will react in different ways. Considering the habitat and species involved, are animals likely to panic resulting in harm or undue stress? Can the animals be habituated to the noise? Wild black bears' heart rates have been shown to quadruple when a drone is nearby, but they can habituate to the noise in a few weeks[8].

Animals may respond to the noise of the drone by possibly avoiding the source of the noise and the vehicle from which the noise emanates[9]. This can potentially have an impact on the movement patterns of marine animals. Also, be aware that fish are increasingly known to communicate by sound, so drone noise may interfere with communication.

Visual appearance:

Does the shape, size and colour of the drone affect animals in the area? Is camouflage appropriate to break up the solid colour of the drone? Consider if weather conditions (e.g. sunny vs overcast) will change the need for camouflage [5] e.g. for UAVs when choosing a fixed wing or rotary unit, can it be adapted to mimic non-threatening birds not predators?[2]

Lights:

When operating drones at night or in aquatic environments could the lights impact animals in the area? Depending on the depth of the water and visual conditions, lights from UUVs may impact animal behaviour - e.g. the lights might affect the animals' avoidance response or the phototactic response might alert a predator, and potentially affect the vision of deep sea fauna[10].

Animal ethics approval

If your research using drones has potential to impact animal welfare, contact the Animal Ethics Advisory Team to ascertain whether ethics approval is required. In the first instance, an Animal Ethics Outside Scope application should be submitted for consideration. It is recommended you attach a completed 'Drone Study Outline' to your application.

If ethics committee review of your project is deemed necessary, the animal ethics Committee will consider whether your plan to use drones will minimise any potentially adverse effects on animals in the area, and takes into account the strategies outlined in this document.

Compliance

Drones should be operated by experienced pilots, and in consultation with experts.

- Know and understand your licensing and compliance obligations including Civil Aviation Safety Authority (CASA) regulations, export trade control requirements and any Health, Safety and Environmental considerations.
- Understand the current regulations governing drones in national parks, suburban areas and marine environments.
- It is your responsibility to contact the local authorities and obtain any specific permits required.

If you intend to operate drones outside of Queensland:

- Understand that each state and territory may have different regulations for drone use.
- Contact the Office of Research Ethics and Integrity (OREI) prior to conducting any work outside Qld as additional licences may be required for using animals, which can take several weeks to be approved.
- Will the project be conducted overseas? Note that local laws and regulations will apply in countries outside of Australia, and there may be export trade control implications.

https://www.freepik.com/photos/dog-jump>Dog jump photo created by wirestock

Helpful links

- QLD Government Drones Use Policy
- NSW Department of Planning, Industry and Environment - Drones in parks policy
- NT.GOV.AU - Flying drones in parks
- SA National Parks and Wildlife Service – Drones and aircraft
- Parks Victoria - drone filming and photography guidelines
- WA Parks and Wildlife Service – Remotely Piloted Aircraft (RPA) - Drones
- Tasmania Parks & Wildlife Service
- ACT Government – Use of drones in the ACT

You should always consider the impact of drone use on animals in the area, even if animals are not the focus of your work!

Drone study outline

1. **Project Title:**
2. **Project supervisor:**
3. **Basic study summary:**
4. **Location of study:**
5. **Drone Permits required:**
6. **Drone type:**
7. **Launch/landing site:**
8. **Estimated flying height and pattern:**
9. **Estimated noise produced by drone:**
10. **Species known to inhabit the area:** This should particularly list any known endangered species in the area
11. **Known species behaviours that may be affected:** This should include reproduction, feeding, communication, is the animal nocturnal or diurnal etc.
12. **Anticipated impacts of the drone on the animals:** This should include any known predators, breeding seasons, known stress responses exhibited by the species etc.
13. **Methods used to minimise distress to animals:** This could include any modifications to flight paths, flight approach to areas known to minimise impact on animals, drone camouflage or modifications (size/ type/colour), impacts of weather, time of day, pre-conditioning.
14. **How will the effect of the drone on animals be monitored, recorded and reported:**
15. **Procedures to be followed if animals are disturbed or injured:**

References

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