



SOUTHERN CASSOWARY

KEYSTONE SPECIES

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Introduction

A keystone species is a species which has a disproportionate effect on its ecosystem. The southern cassowary, *Casuarius casuarius*, is considered a keystone species within its habitat in northern Queensland. It is particularly involved with the biodiversity and health of the northern Queensland rainforests. However, the positive work of the southern cassowary has been negatively impacted by human interaction such as habitat destruction and road fatalities. The protection of the southern cassowary has been made difficult due to its shy nature and thus, the lack of data collected concerning the large, flightless bird. However, increasing data is being gathered thanks to advances in science which have aided research methods.

Human Impact

The southern cassowary has a large impact on the rainforests of northern Queensland. Its preferred food source is the fleshy fruits of rainforest flora. Majority of these fruits have seeds too large for organisms other than the cassowary to digest. The seeds of these fruits are passed through the digestive system unharmed and are deposited in a build-up of faeces. The faeces act as fertilizer, allowing rapid germination for the seeds and thus helping distribute new growth and aid the biodiversity within the rainforest (Cassowary Recovery Team, 2017). The southern cassowary is responsible for transporting the seeds of more than 60 plants species throughout the Cape York Peninsula, Queensland (Australian Geographic, 2014). Thus, if it were to become extinct, the rainforests of northern Queensland would suffer a lull in biodiversity, as plants that depend on the cassowary for dispersion will die off. This would in turn effect other fauna within the community and ecosystem by reducing food sources on all levels of the food web. Consequently, the southern cassowary is a definite keystone species (Cassowary Recovery Team, 2017).

The southern cassowary is considered endangered (Save The Cassowary.org.au, 2016) as a 2001 census suggests there are fewer than 1500 left. This number has dropped from 2500-4000 breeding adults in 1988 (Australian Geographic, 2014). This drop-in numbers is due to human impacts on the southern cassowary population. These major threats include habitat loss, degradation and fragmentation; road and vehicle strikes as well as direct human interaction (Cassowary Recovery Team, 2007).

Habitat loss is a major threat for the southern cassowary as it has small range within Australia and northern Queensland. In northern Queensland, by 1997, 81 per cent of the native vegetation had been cleared. Since then, clearing rates have slowed from 3000ha to 1000ha per year (Cassowary Recovery Team, 2007). Further studies show that 80 per cent of the cassowaries' prime habitat, coastal lowland rainforest, has been cleared over the last 100 years (Australian Rainforest Foundation, 2017). Land clearing is a result of human population increase and thus a need for housing developments. This clearing has also resulted in habitat fragmentation which has been proven to disrupt the movement patterns of cassowary within the area as well as segregate feeding and breeding areas, leading to genetic isolation and local extinctions (Cassowary Recovery Team, 2007).

Habitat degradation has also greatly affected the southern cassowary. Habitat degradation is a result of selective logging, weed invasion and changing fire regimes, all of which can be linked back to humans. These factors decrease shelter, breeding sites and food sources for cassowaries. Perhaps the biggest danger factor is pond apple, an introduced weed within the Wet Tropics. The pond apple dominates the community. It replaces the seasonal cycle of fruits and therefore becomes the major food source for cassowaries within the area, which decreases the spread of biodiversity (Cassowary Recovery Team, 2007).

Road and vehicle strikes also negatively affected the southern cassowary (Save The Cassowary.org.au, 2016). As humans have developed the land to suit their purposes, they have constructed a total of 3777km of roads, highways and tracks which pass through the key habitats for the southern cassowary. This has caused habitat fragmentation, created barriers to cassowary movement, introduced unwanted species and caused substantial mortality through direct strikes. According to a study conducted by QPWAS, during 2001-2005, 78 per cent of the total cassowary deaths recorded at Mission Beach were related to road strikes (Cassowary Recovery Team, 2007). Further studies detail that 104 southern cassowary deaths between 1992 and January 2014 were a direct result of vehicle strikes (Save The Cassowary.org.au, 2016). Considering the cassowary is a k-selected organism, slow to reproduce, and has low juvenile survival, the death of one cassowary may have a large impact on the reproductive fitness of surrounding cassowary populations (Cassowary Recovery Team, 2007).

As highlighted above, developments in science have helped improve research methods regarding the southern cassowary. In particular, the development of technologies such as DNA testing has greatly supported researchers in their efforts to track individual cassowary's as well as whole populations using their faeces (Cassowary Recover Team, 2015). This example also illustrates how the international collaboration of scientists is vital as researchers at CSIRO and other organizations followed the example of researches in China, who monitor giant panda numbers using DNA analysis (Anna Salleh, 2009).

Solutions

As the Queensland Government and organizations such as the Cassowary Recovery Team, Mission Beach Cassowaries and Kuranda Conservation gather new information regarding the southern cassowary, new methods of protection have been established. These methods include establishing cassowary corridors, monitoring population sizes, educating and getting the public involved (Cassowary Recovery Team, 2007) as well as calming traffic in known cassowary hotspots (Wet Tropics, 2017).

Cassowary corridors are stretches of land which aid the movement of the southern cassowary through northern Queensland, preventing cassowaries encountering human civilization and consequently, dropping the level of cassowary mortalities and reducing or countering the number of fragmented habitats.

Furtherly, traffic in known cassowary hotspots is being monitored and calmed to

ensure a further decrease in the number of cassowary-vehicle strikes (Cassowary Recovery Team, 2007)

Another big focus of several organizations is the education of northern Queensland communities, particularly Indigenous Australian communities, concerning the conservation of the southern cassowary and its importance for ecosystem biodiversity. This is achieved using social media, websites and catch phrases such as “be Cass-O-Wary” (Wet Tropics, 2017).

These methods of protection and recovery have come about due to improvements in research methods, as mentioned above. This emphasises how developments in scientific methods have aided the conservation of the southern cassowary.

Conclusion

Perhaps the solution which will be most effective in conserving the southern cassowary is to educate and involve the public, concerning the importance of protecting the cassowary. This strategy will provide multiple benefits, one being that once the public realize just how important the cassowary is to the sustainment of the beautiful and diverse northern Queensland rainforests, which surround their neighborhood, they will be more willing to volunteer. Once educated, the public will assist in recording cassowary sightings, aid the development of more cassowary corridors and be warier when driving through known cassowary hotspots, therefore, assisting the conservation of the southern cassowary. Furthermore, the education of the public will also benefit cassowaries in the long term, as this information will be passed down from generation to generation.

Throughout this report, it has been illustrated that certain developments in science have aided the research, protection and, ultimately, conservation of the southern cassowary. This has been particularly emphasized through the example of DNA testing which has been used to monitor the size of cassowary populations in northern Queensland.

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Stage 1 Biology

Keystone Species – Human Endeavour Folio Task

	Criteria Features	A	B	C	D	E
IAE2	Obtaining, recording, and representing data with conventions and formats	Appropriate; accurate and highly effective (A)	Appropriate; mostly accurate and effective	Generally appropriate, with some errors but generally accurate and effective	Inconsistent, with occasional accuracy and effectiveness	Attempts to record and represent some data, with limited accuracy or effectiveness
IAE3	Analysis and interpretation of data and evidence	Systematically analyses and interprets (A)	Logically analyses and interprets	Undertakes some analysis and interpretation	Describes data and undertakes some basic interpretation	Attempts to describe results and/or interpret data
	Formulate and justify conclusions	Logical conclusions with detailed justification (A+)	Suitable conclusions with reasonable justification	Generally appropriate conclusions with some justification	Basic conclusion	Attempts to formulate a basic conclusion
KA1	Knowledge and understanding	Deep and broad knowledge; a range of biological concepts (A+)	Some depth and breadth; a range of biological concepts	Present for a general range of biological concepts	Basic and partial	Limited recognition and awareness
KA3	Exploration and understanding of the interaction between science and society	Critical; good depth (A)	Logical; some depth	Some aspects explored and understood	Partial exploration and understanding of some aspects	Attempts to explore and identify an aspect
KA4	Communication of knowledge	Highly effective use of appropriate terms, conventions, and representations (A+)	Mostly coherent, with effective use of appropriate terms, conventions, and representations	Generally effective, using some appropriate terms, conventions, and representations	Basic; using some appropriate terms, conventions, and/or representations	Attempt is made