

Biology Assessment Task 3, Term 2, Part C

Adaptations and Interactions of the White Faced Reef Heron (*Egretta novaehollandiae*) at Long Reef Platform

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Abstract

This report investigates the adaptations and interactions of the White Faced Reef Heron (*Egretta Novaehollandiae*). The report also discusses the characteristics of the Long Reef Rock Platform, providing fundamental information regarding the Long Reef Rock Platform ecosystem is initially provided. The report provides a species profile of the White Faced Reef Heron, followed by a discussion of trophic interactions of the ecosystem. In addition the report identifies and discusses the adaptations of the White Faced Reef Heron to the ecosystem. Human interactions within the ecosystem are discussed and the impact of these are discussed.

Introduction

The Long Reef Rock Platform is located in the Northern Beaches of Sydney approximately 20 km North of Sydney City at 33°44'34''S, 151°19'05.6''E. Long Reef Rock Platform is part of Long Reef Aquatic Reserve, covering an estimated area of 760,000m² (Department of Primary Industries, 2014).

The Long Reef Rock Platform ecosystem consists of a large rock expanse which faces toward the Pacific Ocean. Behind the large rock platform lies the steep retreating rock face of the cliff. The Long Reef Rock Platform ecosystem hosts wildlife in both terrestrial and aquatic environments.

The Rock Platform is a unique ecosystem as it hosts a wide variety of marine life. The headland behind the rock platform is an important site for migratory birds, which use it as a resting place during migration periods. The geographical formation of the Rock Platform is unique, its large area makes it one of the largest rock platforms in Australia. This large expanse creates many crevices and pools which aquatic organisms inhabit (Department of Primary Industries, 2014).

Species Profile

The White Faced Reef Heron (*Egretta novaehollandiae*) is a relatively large bird. It has a light grey-blue body with a contrasting white face, crown, chin and upper throat (Figure 1). The average adult will be between 60-70cm in height and will weigh between 450-500 grams (Department of Conservation, 2013). The White Faced Reef Heron is distributed throughout most of Australasia. In Australia it is found near bodies of salt and fresh water in both coastal and inland environments (International Union for Conservation of Nature, 2000).

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Figure 1. Bird Life, *White Faced Reef Heron*. (Birdlife, 2010). [Photograph]

<http://birdlife.org.au/bird-profile/white-faced-heron>

White Faced Reef Herons are tree dwellers and as such they build a nest constructed from small sticks within the branches of a tree. The nest is usually constructed in the higher reaches of the tree as to avoid predators which may eat the eggs or juvenile birds. Both sexes share the construction of the nest as well as the incubation and raising of the young. After fertilization a female will lay approximately 3-5 eggs. The eggs are incubated for approximately 26 days after which they begin to hatch. The juvenile birds will continue to be fed by adult birds until they are several weeks old. (Packwood, 2014; Department of Conservation, 2013).

The White Faced Reef Herons are capable of taking flight, using slow but powerful wingbeats which are used to travel long distances. When searching for prey the Heron will move in a slow stalking motion placing its feet carefully into bodies of water so disturbance of the water is minimized. While the Heron moves it will simultaneously search for prey (Figure 2). The prey is skewered or grasped with the long elongated beak. The White Faced Reef Heron feeds on a wide variety of prey that includes small fish, some amphibians, insects, crustaceans and other small invertebrates (Packwood, 2014).



Figure 2. IBC, *White Faced Reef Heron Feeding*. (Taylor, 2011) [Photograph].

<http://ibc.lynxeds.com/photo/white-faced-heron-egretta-novaehollandiae/adult-bird-feeding-rocky-estuary>

The White Faced Heron is an apex predator and as such has no predators within the ecosystem. The eggs and juvenile birds can however be eaten by other species such as kookaburras and lizards (Packwood, 2014).

Trophic Interactions

The White Faced Reef Heron is an apex predator placed in the 5th trophic level in the long reef ecosystem as a top carnivore (Figure 4). As a result of this many of its trophic interactions are that of predation. The White Faced Herons feed on a wide variety of prey. However due to it inhabiting areas close to water it feeds primarily on aquatic animals.

One example of a trophic interaction is the interaction between the Smooth Toad Fish and the White Faced Reef Heron is a predator of the Toad Fish. This Trophic interaction is one of predation. In the Long Reef ecosystem the Toad Fish is primarily carnivorous, feeding on zooplankton (Booth & Schultz, 1999). In relation to the White Faced Reef Heron it is classified as prey due to it being a second level carnivorous consumer (Figure 4 & 5).

An example of trophic interactions within the Long Reef Rock Platform is the predation between the White Faced Reef Heron and the Hinge Beak Prawn. The Hinge Beak Prawn feeds on phytoplankton such as algae and is classified as a first level consumer (Figure 4 & 5) (Calado, 2008).

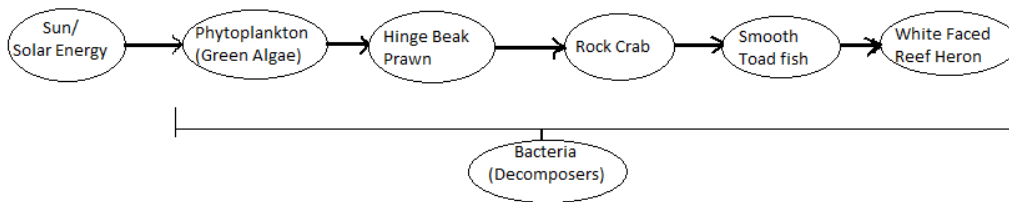


Figure 4. *Food Chain of the Long Reef Rock Platform Ecosystem* [Diagram].

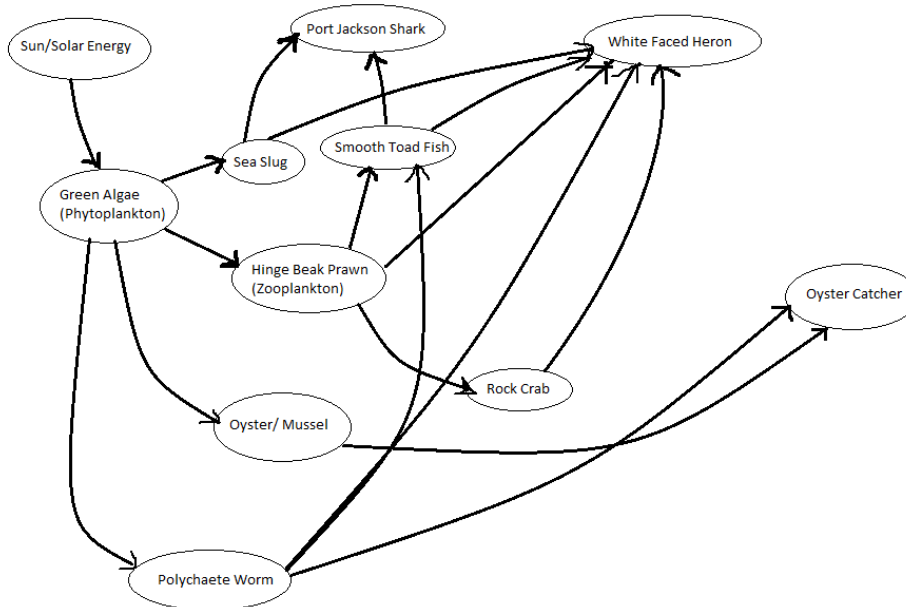


Figure 5. *Food Web of the Long Reef Rock Platform Ecosystem* [Diagram].

Adaptations of the White Faced Reef Heron

The White Faced Reef Heron inhabits a wide variety of environments and is capable of eating a wide variety of prey (Figure 5). In order to become such a successful species it has developed specialized adaptations that have enabled it to survive.

One adaptation that has enabled the White Faced Reef Heron to survive in the Long Reef Rock Platform ecosystem is the development of a long elongated beak. The heron's beak is capable of skewering as well as grasping its prey. The ability to skewer and grasp prey is achieved by the beak's strong keratin structure, enabling resistance against the high degrees of pressure which are applied when killing its prey. This adaptation has enabled the heron to efficiently kill its prey, aiding its survival at the Long Reef Ecosystem.

Another adaptation that has aided in the survival of the White Faced Reef Heron is the development of its tall stature. The tall stature of the White Faced Reef Heron has enabled wading into deeper water, while simultaneously stalking and searching for prey. In particular the thin stilt-like legs of the Heron that support the long elongated body and allow for movement in greater depths of water. The heron's long thin legs also allow for the slow stalking and causes minimal disturbance to the water. The thin long neck of the heron also contributes to its tall stature and has enabled the Heron to achieve a longer range in which it is capable of striking its prey. Therefore, the tall stature of the White Faced Reef Heron has increased the effectiveness of its stalking and hunting techniques hence aiding in its survival at the Long Reef ecosystem (Packwood, 2014; Schreiber, 2001).

Human Impacts

The Long Reef Rock Platform provides evidence as to effects and impacts of human interaction on the ecosystem.

One prominent example of human interaction within the ecosystem is the collection of rubbish which had assembled in the channels and rock pools of the rock platform. The rubbish primarily consisted of fishing waste, in particular line and hooks. This pollution can be harmful to the species which inhabit the ecosystem particularly larger animals which are capable of swallowing this waste or becoming entangled. This evidence indicates a negative impact of human interaction within the Long Reef Rock Platform ecosystem.

An additional example of human impacts within the ecosystem is the runoff from storm water drains in the nearby area. The storm water drains collect water as well as harmful substances which runoff from various industrial and commercial projects. These substances are harmful to various species in the ecosystem, particularly aquatic life. The aquatic life experiences constant exposure to the substances in which diffuse into the water. This can lead to damaging effects such as the adverse health effects on animals as well as the disruption of some natural cycles that occur within the ecosystem. From this evidence there is an indication of a negative impact on the ecosystem.

Another example of human interaction within the ecosystem would be the environmental management of the ecosystem. This environmental management has led to the cleanup of potentially harmful waste such as the rubbish that collects in the rock pools as well as the management of water runoff. The management of the Long Reef Rock Platform has increased the biodiversity of the ecosystem through the conservation of multiple species. These species, without human intervention, may have suffered substantial population loss or have been removed entirely from the ecosystem. The substantial loss or the potential removal of a species from the ecosystem could potentially lead to the collapse of the food chain impacting multiple species. The evidence suggests that overall, human interaction has had a positive impact on the ecosystem.

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References

Birdlife. (2010). *White-faced Heron*. Retrieved May 28, 2016, from BirdLife Australia,

<http://birdlife.org.au/bird-profile/white-faced-heron>

Booth, D. J., & Schultz, D. L. (1999). *Seasonal Ecology, Condition and Reproductive Patterns of the Smooth Toad Fish* (1st ed.)

Calado, R. (2008). *Marine Ornamental Shrimp: Biology, Aquaculture and Conservation* (1st ed.) John Wiley & Sons.

Department of Conservation. (2013). *New Zealand birds online*. Retrieved May 28, 2016, from

<http://nzbirdsonline.org.nz/species/white-faced-heron>

Department of Primary Industries. (2014). *Long Reef Aquatic Reserve*. Retrieved May 26, 2016, from

Department of Primary Industries, <http://www.dpi.nsw.gov.au/fishing/marine-protected-areas/aquatic-reserves/long-reef-aquatic-reserve>

International Union for Conservation of Nature. (2000). *Egretta novaehollandiae* (white-faced Heron).

Retrieved May 28, 2016, from The IUCN Red List of Threatened Species,

<http://www.iucnredlist.org/details/22696938/0>

Packwood, R. (2014). *White-faced heron - Egretta novaehollandiae*. Retrieved May 28, 2016, from

Arkive, <http://www.arkive.org/white-faced-heron/egretta-novaehollandiae/image-G138401.html>

Sam Humphrey,
Year 11 preliminary

Schreiber, E. A. (2001). *Biology of marine birds* (1st ed.). Boca Raton, FL: CRC Press.

Taylor, D. (2011, October 1). *White-faced Heron photo: Adult bird feeding in rocky estuary*. Retrieved May 28, 2016, from International Bird Collection, <http://ibc.lynxeds.com/photo/white-faced-heron-egretta-novaehollandiae/adult-bird-feeding-rocky-estuary>