

Ascension Island Biodiversity Action Plan

LAND CRAB




Photo: S. Weber

SUMMARY

Taxonomy: Kingdom: Animalia; Phylum: Arthropoda; Class: Crustacea; Order: Decapoda; Family: Gecarcinidae; Genus: Johngarthia; Species: *Johngarthia lagostoma*

Nativeness: Native, breeding

Description: Large, terrestrial crustacean reaching a maximum carapace width of around 12 cm. Occurs in a wide range of colour morphs from pale yellow-orange to deep purple. Adult males often have elongated claws (chela) and are larger than females on average. Generally nocturnal, preferring to shelter in burrows during the day. Mainly herbivorous, but is an opportunistic scavenger and will occasionally take live prey.

IUCN Red List status: Not evaluated 

Local trend: Unknown 

Threats: Threats to land crabs on Ascension Island are poorly understood but may include invasive alien species and climate change. Minor threats include road traffic and deliberate persecution.



Distribution	
Global	
Endemic to the central and western Atlantic islands of Ascension (UK), Trindade (Brazil), Fernando de Noronha (Brazil) and Atol das Rocas (Brazil).	
Local	
<p>Non-spawning: During the non-breeding season (May – January) land crabs are generally confined to altitudes above 200 m where the climate is cooler and wetter and vegetation cover is greater (Fig. 1; [1,2]). However, their distribution is patchy and population densities vary significantly. Although quantitative data are lacking, densities appear to be highest in the mid-elevation zone between 400 and 600m.</p> <p>Spawning: Between January and May, many adults migrate from higher elevations to spawning sites along the southern and eastern shores (Fig. 1; [3,4]). The majority of spawning occurs at North East Bay, with secondary sites in the Hummock Point area and at Spire Beach [4]. However, low levels of activity have been documented along much of the southern and eastern coastlines including at Sandy Run, Pillar Bay, Crystal Bay, Sharp Cliff and Porpoise Point (Fig. 1).</p>	<p>Figure 1. Approximate distribution of land crabs during the spawning and non-spawning seasons. Symbol sizes for spawning distribution are scaled according to intensity of activity along a fixed transect. Approximate non-spawning distribution is defined as the area bounded by the 200 m contour [1].</p>

3. Status				
GLOBAL	Population estimate:	Unknown	IUCN status:	Not Evaluated (NE)
There is no information on the global population size or trends of <i>J. lagostoma</i> .				
LOCAL	Population estimate:	> 40,000 adult females	Local trend:	Unknown
<p>Very few numerical data on land crab abundance have been collected. A 2013 survey of spawning activity along 10 coastal transects, including all known spawning hotspots, generated an approximate minimum estimate of 80,000 adult females [4] (AIG, unpublished data). However, this estimate does not account for spawning that occurred outside of surveyed areas, deferred breeding or multiple spawning by the same females within a season and consequently has low confidence. Insufficient data have been collected with which to assess trends; however, there are anecdotal suggestions of decline. Historical accounts describe the large-scale harvesting of land crabs by the naval garrison during the 19th century [5], including 335,535 killed between 1879 and 1887 alone under a bounty scheme to control agricultural pests [6]. Writing in 1887, the garrison's Commandant stated "Land crabs are still a large item, but the men have to go very far afield to get many" [6]. In addition, demographic studies of <i>J. lagostoma</i> on Ascension have suggested a highly skewed size-frequency distribution, with very few individuals < 60 mm, which may indicate an aging population [3]. Although some 'trickle' recruitment of megalops has been documented in recent years [4], the only recorded mass recruitment events date from March 1963 and April 1977, both in Georgetown [3,7]</p>				

4. Ecology	
Habitat & diet	
<p>Post-larval land crabs are terrestrial, generally foraging at altitudes higher than 200m on Ascension Island [1,2], although precise habitat preferences and requirements are poorly understood. They spend much of the day in burrows excavated in vegetated areas and are usually active on the surface only at night or after heavy rain. They</p>	



<p>feed mainly on plant material, but will scavenge dead animals and occasionally catch live ones. Rats, green turtle hatchlings and seabird eggs are all known to be predated. Spawning occurs across a range of coastal habitat types including rocky shore and sand and cobble beaches. Larvae are marine planktonic.</p>
<p>Reproduction & life history</p>
<p>Spawning predominantly occurs during the warmer months between January and June and exhibits pronounced lunar entrainment, with major spawning peaks occurring during the final quarter of the moon [4,8]. Mating occurs along migration routes or upon reaching the coast. Eggs are laid a few days later and are incubated by females beneath their abdomens for approximately 2 weeks [8]. Average clutch size is ca. 72,000 eggs [8], and there is evidence that some females may spawn more than once within a season [4]. Once the eggs are ready to hatch, females briefly enter the sea and the planktonic larvae are released. The larvae drift with the currents, moulting through several zoeal stages over a 2-3 week period [1,4]. The final larval stage, known as a megalops, settles and emerges onto land where it quickly metamorphoses into the first crab stage [4]. Preliminary tagging data suggests that <i>J. lagostoma</i> is long-lived and slow-growing, with a reproductive lifespan of around 20-30 years.</p>
<p>Taxonomy & population structure</p>
<p>A phylogenetic study of <i>J. lagostoma</i> has recently been completed and indicates significant genetic differentiation between the Ascension Island population and those found on Trindade, Fernando de Noronha and Atol das Rocas (Sole Cava et al. in submission). The closest relative of <i>J. lagostoma</i> is <i>J. weileri</i>, a native of Cameroon and the Gulf of Guinea islands in the eastern Atlantic.</p>

4. Threats*		
8.1.1 Invasive non-native/alien species/diseases (unspecified species)	Impact:	UNKNOWN
<p>Virtually nothing is known about the impacts of invasive alien species on land crabs, although these could be substantial. Introduced rodents, lizards and mynah birds, and even predatory invertebrates such as centipedes, are all potential predators of smaller juvenile land crabs and megalops. Rats are known to predate land crabs elsewhere, and their introduction has been implicated in the rapid decline of some populations (e.g. [9]). There have been very few direct observations of rats predated land crabs on Ascension Island [10,11] and stomach content analysis suggests that it is rare [11], although this may be because identifiable hard parts are seldom consumed [12]. Given the apparent increase in rodent numbers following the eradication of feral cats in 2004 [13], increased vigilance is warranted in future. An observation of a large male rat overpowering a juvenile land crab in broad daylight in February 2015 demonstrates that some predation is already occurring (S. Weber, pers. obs.) and this may increase in future. If smaller juveniles are being disproportionately targeted, then the effects on adult spawning population may only become apparent decades later. Competition with introduced herbivores is also a possibility, although this may have been offset by the greater abundance of food afforded by the spread of exotic vegetation. Land crabs rely on plants for shade, shelter, and for much of their food and water and have potentially benefitted from the progressive greening of the Island. However, as the diet and habitat requirements of <i>J. lagostoma</i> are still poorly understood it is too early to assess the overall impacts of changes in plant community structure.</p>		
11.1 Climate change & severe weather: Habitat shifting & alteration	Impact:	UNKNOWN
<p>Changes in the altitudinal distribution of montane habitats are predicted by most global climate models and may reduce the area of suitable foraging habitat for land crabs. Adult land crabs are already largely confined to cooler, moister, more vegetated upland areas outside of the spawning season [1] and this bioclimatic zone may shift to even higher elevations in response to rising air temperatures and increased evapotranspiration [14]. However, a number of other factors such as changes in precipitation and vegetation responses complicate predictions of climate-induced habitat shifts [14]. Regular monitoring of land crab distribution, vegetation characteristics and climatic variables is needed to evaluate this threat.</p>		
11.5 Climate change & severe weather: Temperature extremes	Impact:	LOW
<p>According to global climate models, mean air temperatures on Ascension Island may increase by as much as 3.6 C by the 2080s. Land crabs generally seek refuge from extremes of temperature in burrows. However, the risk of succumbing to heat stress during spawning migrations across arid, coastal habitat may be increased. Sea temperatures are also predicted to rise in concert with air temperatures and may affect the development and</p>		



survival of planktonic larval stages. The thermal tolerances of <i>J. lagostoma</i> larvae have not been established and will need to be experimentally determined before impacts can be predicted.		
11.5 Climate change & severe weather: Other impacts	Impact:	UNKNOWN
Ocean circulation is almost certain to be affected by climate change. If local current systems at Ascension Island are altered then the retention of planktonic larval land crabs in coastal waters could be significantly impacted, although this could either increase or decrease recruitment depending on the changes that occur.		
4.1 Roads & railroads	Impact:	LOW
Road traffic is a small but on-going source of mortality for land crabs, especially when they are most active, at night, after rain or during migration. There is a risk on the NASA Road and the Green Mountain road throughout the year, and on the North East Bay road during spawning migrations. Road traffic is a significant threat to land crabs on more populous islands [15], and could become a more problematic on Ascension Island if the volume of traffic on these routes increases for any reason.		
5.1.1 Hunting & collecting terrestrial animals (intentional use)	Impact:	NEGLIGIBLE
Land crabs have never been exploited for food on Ascension Island to the same extent as on many Caribbean and Indo-Pacific islands and there is no local tradition of use. The nineteenth century naval garrison are known to have eaten them on occasion [5] and until relatively recently small numbers of claws were harvested for local consumption, primarily by contractors on the American base [16]. This practice is now illegal, but may still occur occasionally.		
5.1.3 Hunting & collecting terrestrial animals (persecution/control)	Impact:	NEGLIGIBLE
Although the mass persecution of the nineteenth century no longer occurs, land crabs are still disliked or treated with indifference by some island residents. These unfavourable attitudes have anecdotally resulted in crabs being deliberately harmed or killed, for example on roads.		
*Threats are classified and scored according to the IUCN-CMP Unified Classification of Direct Threats [17]		

Relevant policies and legislation
Local
<i>Johngarthia lagostoma</i> is protected locally under the Wildlife Protection Ordinance 2013 , which prohibits the damaging, killing or possession of protected species without license.
The major land crab spawning site at North East Bay is designated as a Nature Reserve under the National Protected Areas Order 2014 and National Protected Areas Regulations 2014 , which prohibit all forms of development. Much of the upland, non-spawning range is also included in Green Mountain National Park.

Management notes
The almost complete lack of information on the threats currently facing land crabs and on the status of the population means it is virtually impossible to prescribe management measures or to assess the need for action. Gathering baseline data on abundance and distribution, developing robust population monitoring protocols and improving ecological understanding are therefore key management objectives for this species. Ascension Island Government’s Operation Land Crab project has begun to collect some fundamental data on spawning behaviour and growth rates. However, a more in depth post-graduate or post-doctoral study would be useful to rapidly address key knowledge gaps. In particular, a more detailed knowledge of habitat requirements, diet and interactions with introduced rodents (trophic and competitive) are needed to evaluate the threats posed by invasive alien species.
Climate change poses a potentially long term risk to much of Ascension’s terrestrial ecosystem, including land crabs, but the nature of changes that will occur is difficult to predict. The establishment of a broadly-based climate monitoring network within the Territory, including increased collection of meteorological data and the identification of appropriate bio-indicators, will be needed to detect long term changes in the environment and assess management options.

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