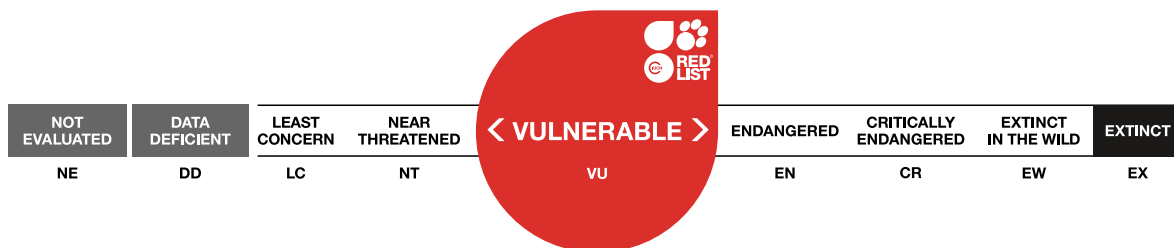


Conolophus pallidus, Barrington Land Iguana

Assessment by: Gentile, G. & Grant, T.D.



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Citation: Gentile, G. & Grant, T.D. 2020. *Conolophus pallidus*. *The IUCN Red List of Threatened Species* 2020: e.T5239A3014028. <https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T5239A3014028.en>

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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Reptilia	Squamata	Iguanidae

Scientific Name: *Conolophus pallidus* Heller, 1903

Common Name(s):

- English: Barrington Land Iguana, Santa Fe Land Iguana
- French: Iguane terrestre de l'île Santa Fe
- Spanish; Castilian: Iguana Terrestre de Barrington

Taxonomic Source(s):

Iguana Taxonomy Working Group (ITWG). 2016. A checklist of the iguanas of the world (Iguanidae; Iguaninae). In: J.B. Iverson, T.D. Grant, C.R. Knapp and S.A. Pasachnik (eds), *Iguanas: Biology, Systematics, and Conservation*, pp. 4–46. Herpetological Conservation and Biology 11(Monograph 6).

Taxonomic Notes:

Barrington Land Iguanas appear to be sister to a clade composed of the western (Isabela and Fernandina) populations of *Conolophus subcristatus* (Gentile *et al.* 2009).

Assessment Information

Red List Category & Criteria: Vulnerable A1ce; D2 [ver 3.1](#)

Year Published: 2020

Date Assessed: December 1, 2019

Justification:

The Barrington Land Iguana is only found on Santa Fé (Barrington) Island, Galápagos Archipelago, Ecuador, and has an estimated area of occupancy and extent of occurrence of 40 km². Based on the denuded landscape caused by non-native goats, historic human consumption, and low numbers of iguanas observed in the 1960s–1970s, it is estimated that the iguana population had been reduced by at least 50% up to a point three generations in the past (52 years) and probably continued until after the goats were eradicated in 1972. The most recent survey in 2005 estimated their population to be 3,500–4,000 mature adults and potentially stable, although it was unknown if they had neared carrying capacity. Molecular analysis also shows extremely low genetic variation and richness compared to sampled populations of the Common Land Iguana (*Conolophus subcristatus*). Heavy predation pressure on this congregatory nesting iguana by Galápagos Hawks may have affected the rate of population recovery since goats were eradicated (1972). The recent introduction to the island of >500 juvenile Española Tortoises that compete with iguanas for scarce food resources may have an impact on the future stability of the iguana population.

Previously Published Red List Assessments

1996 – Vulnerable (VU)

<https://dx.doi.org/10.2305/IUCN.UK.1996.RLTS.T5239A11121073.en>

1994 – Rare (R)

1990 – Rare (R)

1988 – Rare (R)

1986 – Rare (R)

Geographic Range

Range Description:

The Barrington Land Iguana is only found on the uninhabited Santa Fé (Barrington) Island, Galápagos Archipelago, Ecuador (Gentile *et al.* 2009). This lizard is found throughout the island from 0 to 259 m above sea level, not including satellite cays offshore. The area of occupancy (AOO) is estimated at 40 km² (using a 2x2 km grid cell overlay). The estimated extent of occurrence by minimum convex polygon surrounding Santa Fe Island is 27 km² and adjusted to 40 km² to align with the definition of AOO.

Country Occurrence:

Native, Extant (resident): Ecuador (Galápagos)

Distribution Map



Legend

■ EXTANT (RESIDENT)

Compiled by:

Gabriele Gentile, IUCN SSC Iguana Specialist Group 2019



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.



Population

The current population size and trend of the Barrington Land Iguana is unknown. The most recent systematic survey was completed in 2005 (Márquez B. *et al.* 2010) using the Petersen mark-recapture method and estimated a total population of 5,016 individuals (range: 4,500–5,800). All age classes were seen; the male to female ratio was even. Based on the number of juveniles and adults captured, the number of mature adults in 2005 can be roughly estimated at 3,500–4,000. The population is known to have been impacted in the past by heavy human predation and food competition with goats (*Capra hircus*) that were introduced in the 1930s. Photographs of the island in 1965 and 1973 showed the island was mostly completely barren of vegetation (Christian and Tracy 1980). Very low numbers of old adult iguanas were reported during 1967–1971 (Higgins 1978). In the 1980s, the iguana population density was considered to be low, though it is believed the population had stabilized, or nearly so, since the eradication of goats in 1972 (Snell *et al.* 1984, Snell and Christian 1985).

Molecular analysis has revealed that the Barrington Land Iguana has extremely low genetic variation and richness in comparison to several sampled populations of the Common Land Iguana (*Conolophus subcristatus*) and even the micro-endemic Galápagos Pink Land Iguana (*Conolophus marthae*) (Tzika *et al.* 2008). It is possible that the intense grazing pressure goats had on the island's vegetation negatively impacted the iguana population, resulting in a decrease of the census size. This might have caused a further loss of genetic variation, still evident today despite a population increase after goats were eradicated.

Based on the low numbers of iguanas reported three generations ago (52 years) and their potentially stable population of 3,500–4,000 mature adults today, it is estimated that the Barrington Land Iguana population had declined by at least 50% during the occupation of invasive goats. It is unknown if the current population is close to carrying capacity.

Current Population Trend: Unknown

Habitat and Ecology (see Appendix for additional information)

Santa Fé is among the driest islands in the Galápagos. It receives 10 mm rainfall in dry years and 600 mm in rainy years, with an average annual temperature of 23.8° C (Marquez B. *et al.* 2010). Endemic tree cactus (*Opuntia echios*), truncated *Opuntia* species, Palo Santo tree (*Bursera graveolens*), and two shrub species (*Cordia lutea* and *Lantana peduncularis*) constitute the dominant vegetation over most of the island (Christian and Tracy 1981). Iguanas eat the pads, fruits, and flowers of *Opuntia*, shrubs, vines, and grasses. The island is extremely rocky, with many cliffs and steep ridges. Iguanas predominantly use rock holes for retreat burrows as digging is difficult. There are a few isolated patches of habitat on the island that are suitable for nesting, with loose red cinder soil, that are flat and have relatively little vegetation cover. At the nesting sites, there is essentially no cover in the form of rock crevices that occur virtually everywhere else on the island. The dominant vegetation in the nesting area is the shrub *Encelia hispida* which neither adult nor hatchling were ever observed to eat (Christian and Tracy 1981).

Because of the topography of the island and unlike other regional iguanas, Barrington Land Iguanas nest communally in these few available sites. Females migrate to their specific nesting area (not necessarily the closest) at least 1.5 km from their normal home range. Nesting activity peaks in mid-October. Females fight for space during the exploratory digging phase and most defend their nests for a couple of

days to over a month after laying their eggs. Hatchlings emerge in February coinciding with the beginning of heavy rains when the vegetation is lush and in bloom. Hatchlings (40 g, 10 cm body length) disperse from the nests within 1–2 days to areas with more cover and food. During emergence, the native Galápagos Hawk (*Buteo galapagoensis*) gathers and preys heavily on new hatchlings. Communal nesting has the disadvantage of attracting predators as well as nest failure from accidental excavation by late arriving nesting females (Christian and Tracy 1982).

Male Barrington Land Iguanas can reach 56.4 cm in snout-to-vent length and average 7.1 kg; females average 4.3 kg (Christian *et al.* 1985). Based on data for *Conolophus subcristatus*, these iguanas are expected to be reproductively mature at five years and remain so throughout their lifetime until *ca* 30 years (Fabiani *et al.* 2011). Their estimated generation length is therefore 17.5 years

Systems: Terrestrial

Use and Trade (see Appendix for additional information)

All Galápagos iguanas are listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Ecuador has never declared export of live specimens of *Conolophus pallidus* for commercial trade (CITES trade data, UNEP-WCMC 2018) and they are currently not known to exist in the illegal international pet trade, unlike *Conolophus subcristatus*.

Threats (see Appendix for additional information)

Santa Fé is one of the few Galápagos islands where iguanas are not threatened by invasive alien predators such as cats (*Felis catus*) and Black Rats (*Rattus rattus*). Only one report of a free-roaming domestic dog (*Canis familiaris*) was observed and removed (Phillips *et al.* 2012). However, while predation by the native Galápagos Hawk is a natural event, because Barrington Land Iguanas are congregatory nesters, their impact on hatchling survival is significant and may have affected the rate of population recovery in this small population.

Barrington Land Iguanas experienced a severe genetic bottleneck in the past and now exhibit very low genetic diversity compared to other land iguana populations. Low genetic variability may have serious consequences for the fitness of the population and could reduce their ability to rapidly adapt to changing environmental conditions (including infectious disease) and demographic stability (Frankham *et al.* 2014). It is unknown if this lack of diversity will be deleteriously expressed in future generations of iguanas.

During 2015–2019, 549 juvenile Española Tortoises (*Chelonoidis hoodensis*) were released on Santa Fé, and more releases are planned annually until 2026 (Galápagos Conservancy 2015, 2019). Tortoises compete with land iguanas for scarce food resources, such as *Opuntia*, that are stressed during periods of drought. While this introduction is meant to replace a species that went extinct more than 150 years ago, the size of that historic tortoise population is unknown. It is unknown if the future climate will have increased frequency and duration of droughts and whether the tortoises and iguanas will impact each other's recovery.

Conservation Actions (see Appendix for additional information)

The entire distribution of Marine Iguanas is included in three protected areas: Galápagos National Park

and National Marine Reserve, Galápagos Islands Man and Biosphere Reserve (UNESCO), and Galápagos Islands World Heritage Site.

Several eradication programmes for invasive alien predators have occurred throughout the Galápagos, including goats (*Capra hircus*) from Santa Fé (Phillips *et al.* 2012) in the 1970s that has had a substantial impact on regeneration of the vegetation and appears to have promoted the recovery of the iguana population (Christian and Tracy 1980, Snell *et al.* 1984).

Conservation and research actions recommended for the species include further genetic analysis of the historic specimen collection of Barrington Land Iguanas from the era before the goats were on the island to pinpoint the timing and duration of the observed genetic reduction. Genetic data may be available to reconstruct the demographic history of the species. Regular and continued monitoring of the iguana population is recommended, as well as monitoring the impact of the tortoise introduction to the vegetation and the potential competition with iguanas for food resources. Attention should be made to the population trend and recovery of iguanas as the tortoises age, including in relation to the frequency and severity of droughts in a future climate.

Credits

Assessor(s): Gentile, G. & Grant, T.D.

Reviewer(s): Smith, G.R.

Authority/Authorities: IUCN SSC Iguana Specialist Group

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Citation

Gentile, G. & Grant, T.D. 2020. *Conolophus pallidus*. *The IUCN Red List of Threatened Species* 2020: e.T5239A3014028. <https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T5239A3014028.en>

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External Resources

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Appendix

Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Habitat	Season	Suitability	Major Importance?
1. Forest -> 1.5. Forest - Subtropical/Tropical Dry	Resident	Suitable	Yes
3. Shrubland -> 3.5. Shrubland - Subtropical/Tropical Dry	Resident	Suitable	Yes
4. Grassland -> 4.5. Grassland - Subtropical/Tropical Dry	Resident	Suitable	Yes

Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Threat	Timing	Scope	Severity	Impact Score
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.1. Intentional use (species is the target)	Past, unlikely to return	Whole (>90%)	Very rapid declines	Past impact
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
8. Invasive and other problematic species, genes & diseases -> 8.2. Problematic native species/diseases -> 8.2.2. Named species (Capra hircus)	Past, unlikely to return	Whole (>90%)	Slow, significant declines	Past impact
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.3. Indirect species effects		
8. Invasive and other problematic species, genes & diseases -> 8.2. Problematic native species/diseases -> 8.2.2. Named species (Chelonoidis hoodensis)	Future	Majority (50-90%)	Unknown	Unknown
	Stresses:	2. Species Stresses -> 2.3. Indirect species effects		
8. Invasive and other problematic species, genes & diseases -> 8.2. Problematic native species/diseases -> 8.2.2. Named species (Buteo galapagoensis)	Ongoing	Minority (50%)	Causing/could cause fluctuations	Low impact: 5
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.3. Indirect species effects		
12. Other options -> 12.1. Other threat	Future	Majority (50-90%)	Unknown	Unknown
	Stresses:	2. Species Stresses -> 2.3. Indirect species effects		

Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Action in Place
In-place research and monitoring
Action Recovery Plan: No

Conservation Action in Place
Systematic monitoring scheme: No
In-place land/water protection
Conservation sites identified: No
Percentage of population protected by PAs: 91-100
Area based regional management plan: No
Occurs in at least one protected area: Yes
Invasive species control or prevention: No
In-place species management
Harvest management plan: No
Successfully reintroduced or introduced benignly: No
Subject to ex-situ conservation: No
In-place education
Subject to recent education and awareness programmes: No
Included in international legislation: Yes
Subject to any international management / trade controls: Yes

Research Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Research Needed
1. Research -> 1.2. Population size, distribution & trends
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Distribution
Estimated area of occupancy (AOO) (km ²): 40
Continuing decline in area of occupancy (AOO): No
Extreme fluctuations in area of occupancy (AOO): No
Estimated extent of occurrence (EOO) (km ²): 40
Continuing decline in extent of occurrence (EOO): No
Extreme fluctuations in extent of occurrence (EOO): No

Distribution
Number of Locations: 1
Continuing decline in number of locations: No
Extreme fluctuations in the number of locations: No
Lower elevation limit (m): 0
Upper elevation limit (m): 259
Population
Number of mature individuals: 3,500-4,000
Continuing decline of mature individuals: Unknown
Extreme fluctuations: No
Population severely fragmented: No
No. of subpopulations: 1
Continuing decline in subpopulations: No
Extreme fluctuations in subpopulations: No
All individuals in one subpopulation: Yes
No. of individuals in largest subpopulation: 3500-4000
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Unknown
Generation Length (years): 17.5
Movement patterns: Not a Migrant

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