IUCN Conservation Outlook Assessment 2014 **(archived)**
Finalised on 12 September 2014

Please note: this is an archived Conservation Outlook Assessment for Aldabra Atoll. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Aldabra Atoll

SITE INFORMATION

Country:
Seychelles
Inscribed in: 1982
Criteria:
(vii) (ix) (x)

Site description:

The atoll is comprised of four large coral islands which enclose a shallow lagoon; the group of islands is itself surrounded by a coral reef. Due to difficulties of access and the atoll's isolation, Aldabra has been protected from human influence and thus retains some 152,000 giant tortoises, the world's largest population of this reptile. © UNESCO

SUMMARY

2014 Conservation Outlook

Good with some concerns

Aldabra Atoll remains one of the most undisturbed island ecosystems in the world, and is home to several unique species whose populations thrive. The threat posed by two alien bird species that are known to be highly invasive in many other places and have arrived on the Atoll, is serious, and warrants the strictest of attention permanently. SIF has made substantial progress in this regard, having eliminated one of the species, the red-whiskered bulbul, from Aldabra and reduced the population of this species on Assumption from 5500 to less than 5 individuals with the aim of completing this eradication in 2014. The Madagascar fody is also nearly eradicated from both islands with completion expected in 2015. Unfortunately, the Assumption eradication was too late to prevent both species reaching Aldabra and a full-scale eradication programme had to be launched for both but the bulbul was eliminated quickly and the introduced fodies remain restricted to a small area of Aldabra. Eradication seems achievable given their distribution and the immediate response to their invasion. A detailed rat and cat eradication feasibility study is also ongoing to obtain a better picture of the abundance and survival of these animals on Aldabra, their impacts on native species, and potential control methods. It is essential that proper biosecurity/quarantine measures are established, and a rapid-response plan for potential arrivals of known invasive species from the region developed. In addition to invasive species actions, the Aldabra MPA is proposed for expansion, which will also improve protection of the atoll.
With the populations of many flagship species increasing or stable, long-term monitoring programmes established to monitor the atoll’s biodiversity, eradication of several invasive species either completed or underway, the imminent implementation of biosecurity measures to prevent further invasions, and the expected expansion of the Aldabra marine protected area, the conservation outlook for Aldabra Atoll is currently very good.

Current state and trend of VALUES

Low Concern
Trend: Stable

The populations of all endemic species and sub-species that are being regularly monitored by SIF are stable or increasing. However, reproductive success and population trends of smaller sea birds (and potentially landbirds and other species) and other taxa such as invertebrates and small reptiles could be affected by invasive mammals. Ecological integrity of Aldabra, which is central to its values, should be maintained with the eradication of several invasive species. More efficient monitoring tools that also include reproductive success should be developed.

Overall THREATS

High Threat

Current threats are primarily from invasive species (birds, mammals, and plants), and have the potential to be highly threatening, however, action is currently being taken to control / eradicate these species. The atoll also faces risks from invasive species which have not yet been introduced (e.g. invasive ants) and biosecurity measures need to be improved to limit this threat. Potentially severe threats are from future climate change, ocean acidification and rise in sea level. Modelling different scenarios could be helpful in developing plans to mitigate the effects of such changes.

Overall PROTECTION and MANAGEMENT

Highly Effective

The management of Aldabra is run very professionally by SIF and the atoll is very well protected, legally and in practice. An updated risk-assessment and management plan including invasive alien species measures and a biosecurity and quarantine protocol, is currently in development to improve management even further.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Raised limestone atoll**
Criterion:(vii)

The Aldabra Atoll is one of only two raised coral atolls worldwide that are not heavily impacted by human activities, and it is overall one of the largest coral atolls in the world (Hillary et al. 2002). Aldabra Atoll consists of four main islands of coral limestone separated by narrow passes and enclosing a large shallow lagoon, providing a superlative spectacle of natural phenomena. The lagoon contains many smaller islands and the entire atoll is surrounded by an outer fringing reef (SoOUV, 2010).

▶ **Giant tortoises**
Criterion:(x)

Aldabra houses the largest extant population of giant tortoises worldwide (~100,000 animals), and is one of only two places in the world where taxa of giant tortoises survive (the other being Galapagos, which currently houses a much lower density of giant tortoises per km2). Giant tortoises of many taxa were widespread, in high densities, on islands around the world until humans arrived and exterminated them – directly, or via introduced predators (Hansen et al. 2010, Ecography) The tortoises are the last survivors of a life form once found on other Indian Ocean islands and Aldabra is now their only remaining habitat. The tortoise population is the largest in the world and is entirely self-sustaining: all the elements of its intricate interrelationship with

the natural environment are evident (SoOUV, 2010).

- **A highly significant breeding ground for green turtles and hawksbill turtles**
  Criterion:(x)

  Aldabra is a highly significant breeding ground for green turtles and hawksbill turtles, both of which are endangered (SoOUV, 2010). Alsabra's nesting green turtle population was found to have increased by between five and eight times in the first 40 years of protection (Mortimer et al. 2011).

- **An outstanding example of an oceanic island ecosystem in which evolutionary processes are active**
  Criterion:(ix)

  The property is an outstanding example of an oceanic island ecosystem in which evolutionary processes are active within a rich biota. Most of the land surface comprises ancient coral reef (~125,000 years old) which has been repeatedly raised above sea level. The size and morphological diversity of the atoll has permitted the development of a variety of discrete insular communities with a high incidence of endemicity among the constituent species. The top of the terrestrial food chain is, unusually, occupied by an herbivore: the giant tortoise. The tortoises feed on grasses and shrubbery, including plants which have evolved in response to its grazing patterns. Aldabra emerges as the last place in the world, where the evolutionary ecology of giant tortoise – plant interactions can be studied (SoOUV, 2010).

- **High incidence of endemicity and unique plant communities**
  Criterion:(ix)

  The size and morphological diversity of the atoll has permitted the development of a variety of discrete insular communities with a high incidence of endemicity among the constituent species (SoOUV, 2010). Aldabra houses at least one currently unique, but potentially formerly widespread, habitat type, the tortoise turf. These relatively highly diverse grass-dominated areas are likely to be maintained due to the heavy grazing pressure exerted by the giant tortoises (Merton et al, 1976).

► Significant natural habitat for birds

Criterion:(x)

The property is a significant natural habitat for birds, with two recorded endemic species (Aldabra Brush Warbler [presumed extinct] and Aldabra Drongo), and another eleven birds which have distinct subspecies, amongst which is the White-throated Rail, the last remaining flightless bird of the Western Indian Ocean. Genetic research is ongoing to clarify the species status of the White.throated Rail and the Aldabra Fody, both of which are currently classified as endemic sub-species, but may be distinct species. There are vast waterbird colonies including the second largest frigatebird colony in the world and one of the world's only two oceanic flamingo populations (SoOUV, 2010). Aldabra also contains a population of the endangered Madagascar Pond-heron (Bunbury, 2014), which is in decline in most other parts of its range.

Assessment information

Threats

Current Threats

High Threat

One of the two very recently introduced invasive bird species was successfully eradicated in 2013. The second species is still the focus of an intensive eradication programme launched with UNESCO emergency funding support, and now financed entirely by SIF, which will not be sustainable if the eradication is not completed soon. It is critical that funding be maintained until successful eradication of the Madagascar fody has also been confirmed. To prevent re-introduction, it is equally critical that the current longer-term eradication efforts of the same two bird species on the neighbouring Assumption Island (the source of the birds on Aldabra) are successfully completed, which is anticipated by the end of 2014 (SIF, pers. comm.).
The Aldabra rat and cat research and eradication feasibility study will provide

essential information on the feasibility and costs of such a project and should be completed by the end of 2014.
The main invasive plant species is currently being eradicated and should have been removed from Aldabra by the end of 2014.

The presence of invasive mammals on Aldabra and the risks of other invasive species constitute the current main threats to the atoll. Moreover, the implementation of biosecurity measures will be essential to prevent further introductions (SIF, pers. comm.)

► Invasive Non-Native/ Alien Species

Very High Threat
Inside site

Invasive species remain a major concern but red-whiskered bulbuls have been eradicated from Aldabra in the last 2 years and there is ongoing eradication to eliminate invasive Madagascar fodies (expected to be completed by mid-2015), returning Aldabra to its introduced bird-free state (Seychelles Islands Foundation (SIF), pers. comm.). The Madagascar fody (Foudia madagascariensis) represents a great threat to the survival of the endemic Aldabra fody (Foudia eminentissima aldabrana) through competition/hybridisation (Roberts 1988). Initial research suggests that the two species are hybridizing on Aldabra (SIF, pers. comm.).

► Invasive Non-Native/ Alien Species

Low Threat
Inside site

There are several plant species on Aldabra that are known to be invasive elsewhere, but only one of these is the focus of current eradication efforts (sisal, Agave sisalana) (pers. obs.). In general, research is needed to assess the magnitude of impacts of introduced plant species, and decide on control/eradication efforts. She-oak (Casuarina equisetifolia) has been planted at several points on the atoll and may be invading native vegetation on Ile Picard and at Middle Camp on Ile Malabar. This species is invasive in many places (see IUCN Invasive Species Specialist Group) and an appraisal of its potential impact on Aldabra is needed. There are also several invasive herbs, perhaps most importantly the Madagascar periwinkle (Catharanthus roseus) and the porterweed (Stachytarpheta jamaicensis), which both seem

to be spreading and are able to dominate the low ground vegetation (on Picard; and elsewhere throughout Aldabra, especially along paths). The tortoises seem to avoid eating both of these plants (pers. obs.). Historically there were attempts to control the Madagascar periwinkle but control was too labour intensive to be continued (SIF, unpubl. data).

► Invasive Non-Native/ Alien Species

Very High Threat
Inside site

After the successful eradication of the last feral goats in 2012, the two remaining invasive mammal species are cats and rats. Both of these species are known to be highly invasive and problematic on islands around the world, and there has been recent research into their abundance and impacts on Aldabra. Rats are extremely abundant (comparable densities to other tropical islands), particularly in the vast mangrove areas of Aldabra, and are having impacts on seabirds, landbirds, small reptiles, plants, invertebrates and turtle and tortoise nests through egg predation. Cats are not abundant but their main prey is turtle hatchlings, in addition to rats, small reptiles and invertebrates. Furthermore, they may be responsible for the absence of frigatebirds nesting on Grand Terre and their presence prevents the reintroduction of Aldabra rails to the largest island of Aldabra and improving the prospects for this species. An eradication feasibility study is due to be completed by the end of 2014. Eradication options will be explored pending the recommendations of the study, but mangroves are likely to prove the main problem and, until resolved, eradication is unlikely to be possible, although it should remain a priority (SIF, pers. comm.).

► Water Pollution

Low Threat
Outside site

Aldabra is a remote place, but all the parts of its coastline that are not raised several metres above high tide are littered with marine debris brought in by the tide (plastic products of all kinds, fishing nets, rope, etc.; pers. obs.). This necessitates regular clean-up activity of the sandy beaches used by green turtles for nesting. Cleaning activities on such beaches around the atoll, as part of the regular monitoring activities, seem to work well (pers. obs.). However, on less visited parts of the atoll the beach trash accumulates and

there is a need for a dedicated project to remove beach waste from Aldabra (SIF, pers. comm.).
Nothing is known about how/if the plastic trash on non-sandy coastlines impacts the ecosystem here. For example, large tracts of the coastal grasslands that are favoured grazing areas for the giant tortoises, are also littered with plastic trash (pers. obs.).
A more critical risk is that of a major oil- or chemical spill from ships. While the risk is small, the potential for massive damage is great. A 30 NM oil tanker area of avoidance around Aldabra is currently in place and a new lighthouse has been installed as part of mitigation measures to avoid oil spill accidents. Expansion of the MPA boundary is currently under review (SIF, pers. comm.).

Potential Threats

High Threat

It is important to initiate research to assess the potential impact of climate change on Aldabra’s biodiversity, including mapping and modelling exercises to assess possible climate driven changes in habitats, as well as species focused predictions, including on reproductive biology and demography (sex ratio) of sea turtles and giant tortoises. Only with long-term, properly established baselines will it be possible to detect ecosystem changes at an early stage.

▶ Temperature changes

High Threat
Inside site
Outside site

Climate change can impact Aldabra’s ecosystem in many ways, from direct impacts such as a decreasing land area due to increases in sea level, to more insidious threats like changes in the reproductive biology and demography (sex ratio) of sea turtles and giant tortoises, and climate-driven changes in vegetation ecology that can cascade up through the ecosystem and affect e.g. plant-animal interactions (herbivory, pollination, seed dispersal) and nutrient cycling. The long-term monitoring programmes on Aldabra should detect some of these changes, particularly with the newly set up marine monitoring and experimental work on tortoise exclusion from different

habitats. Maps are also essential to assess the threats; the lagoon area was mapped in 2008; the outer reef area is currently being mapped which will provide baseline data of this habitat; and mapping of the terrestrial area is much needed and the next priority. Recent preliminary analysis of long-term rainfall data suggests that rainfall has declined in the last 40-50 years, which is of concern if the trend continues (SIF, pers. comm.).

Protection and management

Assessing Protection and Management

► Relationships with local people

Highly Effective

SIF's (Seychelles Islands Foundation) activities are well integrated into all levels of Seychelles' society (UNESCO 2007).1

► Legal framework and enforcement

Highly Effective

No information to suggest that the current legal framework is not sufficient. Aldabra's status was established by a legal decree from the Seychelles government (Pers. comm., 2012)

► Integration into regional and national planning systems

Highly Effective

SIF is an active partner in several national and regional planning systems (UNESCO 2007; Pers. comm., 2012).

► Management system

Mostly Effective

There is a management plan that is somewhat outdated (Beaver & Gerlach 1998), but which still forms a very useful base for ongoing monitoring and management. A new management plan is being drafted and will be finalized by the end of 2014 (SIF, pers.comm.). Since the installation of a decentralized photo-voltaic system in 2012, in combination with a switch to

energy-efficient appliances and a new environmental management protocol, the permanent research station on Aldabra is 97% self-sufficient in its energy requirements. This has resulted in a substantial drop in operational costs (Quartz et al, 2013).

► Management effectiveness

Highly Effective

The permanent manned research station on Aldabra ensures timely implementation of all monitoring and management decisions.

► Implementation of Committee decisions and recommendations

Data Deficient

N/a

► Boundaries

Highly Effective

Stable – politically/economically the whole atoll forms the World Heritage Site, and there are no indications that any part of it would lose this status due to human activities. Naturally, the outside boundary is mostly protected by coral reefs, and the inner lagoon is fringed by mangrove forests. An expansion of the marine protected area has been proposed and work on this is ongoing. If realized, this will further strengthen the protection of the marine habitat and biodiversity around Aldabra (SIF, pers. comm.).

► Sustainable finance

Some Concern

Due to the twin-linkage of Aldabra with the entrance fees for the SIF-managed UNESCO World Heritage site Vallée de Mai on Praslin generating substantial funding for managing Aldabra, the current funding situation outlook for Aldabra is adequate, but is entirely dependent on large numbers of international tourists visting the Seychelles and the Vallée de Mai and could be jeopardized by economic recession or any adverse event affecting the Vallée de Mai (a fire for example). Analysis of tourism figures indicates that although tourist numbers to Seychelles is still increasing, the proportion of these tourists visiting the Vallée de Mai is declining (SIF, pers.comm.). SIF

is exploring diversification of sustainable financing options. With a potential alleviation in the piracy threat, there is the potential for further revenue to be generated by tourists visiting Aldabra.

► Staff training and development

Highly Effective

Staff training and facilities seemed excellent during my 2.5 months stay on Aldabra in 2012; staff morale and work ethic were of a high standard.

► Sustainable use

Data Deficient

N/a

► Education and interpretation programs

Highly Effective

SIF has dedicated outreach staff that ensures a high visibility of Aldabra in the Seychelles' society and beyond. The Visitor's Centre at Vallée de Mai has improved people's knowledge of the management link mentioned above. Since 2012, SIF has launched a monthly e-newsletter, a popular Facebook profile and a Twitter page, in addition to regular newspaper and magazine articles. All of these forums have helped to increase the visibility of Aldabra.

► Tourism and interpretation

Highly Effective

Tourism at Aldabra is restricted to day-time visitors from boats mooring outside the reef of the research station. Once on the atoll, there are strict visitor protocols that are closely adhered to. Tourism on Aldabra, however, has been stalled due to the high piracy threat in the area and the fact that Aldabra can only be visited by boat. 2009 was the last year of normal tourism activities on Aldabra. Demand remains high (SIF, pers. comm.) and tourism is likely to increase with a drop in the piracy threat.

► Monitoring

Some Concern

Management monitoring is carried out according to annual workplans and

regularly reviewed (SIF, pers. comm.).
The permanently staffed research station ensures that biodiversity monitoring is carried out regularly. Previously most monitoring focussed on very basic parameters such as ‘number of species X in habitat Y’. This has continued but has more recently been supplemented with monitoring of ecological processes (e.g. flowering plant phenology, landbird and seabird nesting success), whole ecosystem monitoring (e.g marine monitoring), and management-specific monitoring (e.g. for invasive species). In addition, the long-term species monitoring programmes are currently being assessed and revised to ensure that they are able to accurately detect changes to the values of the site and address key management focused questions. The current management aim is to shift towards a more adaptive and responsive approach (SIF, pers. comm.). More targeted monitoring of ecosystem function at a higher level than species presence/abundance (e.g. nutrient cycling, pollination, herbivory) should also be considered.

► Research

Highly Effective

SIF have long-term established collaborations with world-class research institutions on several aspects

Overall assessment of protection and management

Highly Effective

The management of Aldabra is run very professionally by SIF and the atoll is very well protected, legally and in practice. An updated risk-assessment and management plan including invasive alien species measures and a biosecurity and quarantine protocol, is currently in development to improve management even further.

► Assessment of the effectiveness of protection and management in addressing threats outside the site

Data Deficient

Little information is available on the effectiveness of protection and management in addressing threats outside the site, however, the commendable efforts to eradicate invasive birds on the nearest neighbouring

island of Assumption in order to prevent re-invasion of Aldabra should be noted in this regard.

► Best practice examples

The effective and ongoing eradication of invasive alien species from Aldabra (already confirmed in the case of the red-whiskered bulbul and feral goats) and the nearest neighbouring island of Assumption is an example of best practice, which should be (and has already been) used as case studies for application elsewhere.

State and trend of values

Assessing the current state and trend of values

World Heritage values

► Raised limestone atoll

Low Concern
Trend:Stable

While Aldabra itself is geologically stable, increasing sea level may lead to substantial loss of terrestrial habitat in the medium- to long-term future.

► Giant tortoises

Good
Trend:Stable

Monitoring data from the last 15 years show that the giant tortoise population is stable (unpubl. data, SIF). A new estimate of the total population that takes a more detailed measure of vegetation-use by tortoises into account, is in process (SIF, pers. comm.).

► A highly significant breeding ground for green turtles and hawksbill turtles

Good
Trend:Improving

The number of green turtles that nest on the beaches of Aldabra increased

by a factor of 5–8 in the 40 years after protection started (Mortimer et al. 2011) and SIF data on turtle tracks suggests that this upward trend is continuing (SIF, pers. comm.).

► An outstanding example of an oceanic island ecosystem in which evolutionary processes are active

Low Concern
Trend:Data Deficient

Research into plant-animal interactions has recently been started with a PhD student developing a seed dispersal network for Aldabra. Other research is focusing on the impacts of giant tortoises on vegetation dynamics (SIF, perx. comm.). More research into the dynamics of other interactions, such as pollination, herbivory, predator-prey, parasitism, would also be useful for management.

► High incidence of endemicity and unique plant communities

Low Concern
Trend:Data Deficient

More research on the distribution and impacts of introduced/invasive plant species is needed.

► Significant natural habitat for birds

Low Concern
Trend:Stable

Recent landbird data analysis indicates that the populations of at least six of the native landbirds are increasing (with others being stable or data deficient). This analysis will also provide the basis for a review of the monitoring methods to improve this programme. Landbird nesting success is now being monitored and results will be analyzed in 2015 (SIF, pers. comm.). The white-throated rail population increased substantially following a successful reintroduction on the island of Picard (Šúr et al 2013b). The frigatebird population is surveyed annually and increased by 10% in approx. 10 years (Šúr et al 2013a). Tropicbird nesting is also monitored and the use of camera traps to record nest predation events is being trialled. Surveys/monitoring of other seabird species are much needed since these

species are more likely to be affected by invasive mammals.

Summary of the Values

▶ **Assessment of the current state and trend of World Heritage values**
Low Concern
Trend: Stable

The populations of all endemic species and sub-species that are being regularly monitored by SIF are stable or increasing. However, reproductive success and population trends of smaller sea birds (and potentially landbirds and other species) and other taxa such as invertebrates and small reptiles could be affected by invasive mammals. Ecological integrity of Aldabra, which is central to its values, should be maintained with the eradication of several invasive species. More efficient monitoring tools that also include reproductive success should be developed.

Additional information

Key conservation issues

▶ **Newly arrived invasive birds**
Local

The recently arrived Red-whiskered bulbul, Pycnonotus jocosus, was eradicated in 2013, while the Madagascar fody, Foudia madagascariensis, has been much reduced in numbers but still represents a significant threat to the survival of endemic, related taxa.

▶ **Invasive plants and mammals**
Local

The current ‘data deficient’ status for these taxa is being addressed with a rat/cat eradication feasibility study, which will assess the need/feasibility for eradication and/or control. Implementation of a biosecurity plan to protect

Aldabra from future incursions of invasive species is urgently needed.

► Climate change

Global

The current ‘data deficient’ status for our knowledge of likely effects is being dealt with via baseline data (habitat maps of all areas of Aldabra) and initiation of appropriate long-term monitoring (including phenology and marine monitoring).

Benefits

Understanding Benefits

► Importance for research

Aldabra can serve as a major environmental and biological focus for educational efforts at all levels in the Seychelles. Research on Aldabra can be used to inform conservation and restoration efforts on many degraded islands around the world. Protection of Aldabra is providing significant benefits (regarding research, management of endemic species, control of invasive species) which holds important lessons for other protected areas and islands

► Is the protected area valued for its nature conservation?

Many of the species and interactions found on Aldabra are now the last living and/or functional representatives of formerly widespread island species and ecosystems.

Summary of benefits

The value of the Aldabra Atoll as an almost unspoilt ‘island laboratory’ that 1) is of utmost value in itself, and 2) holds priceless information for managing islands elsewhere, cannot be overstated. Aldabra’s successful management provides an excellent case study for the protection of similar sites.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Seychelles Islands Foundation	From: 2017 To: 2017	Biodiversity and ecological process monitoring and surveying, invasive species control/eradication, conservation management, rat and cat eradication feasibility study, biosecurity planning, marine monitoring, reef mapping, MPA expansion, genetic research, movement ecology research of key species.
2	Zurich-Aldabra Research Platform (University of Zürich, SIF)	From: 2017 To: 2017	Research on terrestrial ecology; focus on interplay between giant tortoises, vegetation and climate, movement ecology of giant tortoises.
3	SIF/Durrell Institute of Conservation and Ecology	From: 2017 To: 2017	Hybridisation of invasive and native bird species. Genetics of Aldabra's landbirds.

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	N/a	Implement plans for control and/or eradication of rats and cats.	From: 2017 To: 2017
2	N/a	Implement quarantine controls and rapid-response plans to deal efficiently with potential arrivals of known invasive species.	From: 2017 To: 2017
3	N/a	Complete the eradications of introduced Madagascar fodies and sisal.	From: 2017 To: 2017

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