

Survival Blueprint

Pearl Bubble Coral, *Physogyra lichtensteini*



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Compiler: Sylvanna Antat

Contributors: Rachel Bristol, Justin Prosper

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1. STATUS REVIEW

1.1 Taxonomy:

Anthozoa → *Scleractinea* → *Euphyllidae*

Species: *Physogyra, lichtensteini* (Milne-Edwards and Haime, 1851)

Common name English: Pearl Bubble Coral

1.2 Distribution and population status:

1.2.1 Global distribution:

Country	Population estimate (plus references)	Distribution	Population trend (plus references)	Notes
Seychelles		Ste Anne MPA, Beau Vallon, Belombre, Denis Island, Silhouette, North Island, Marianne, Petite Soeur, Grande Soeur, Baie Lazare, Baie Ternay MPA, Port Launay, Eden Island, Curieuse, Praslin	Small colonies observed in these areas	

1.2.2 Local distribution:

Country	Region / province	Site	Level of Protection	Population size	Notes
Seychelles	Inner islands	Praslin	none	Small, isolated, to the North & North East	
		Curieuse	Marine Protected Area	Small, isolated, eastern side	
		Denis	Private, some protection	Small populations, North and South West	
		North	Private, some protection	Larger population, West of island	
		Silhouette	Marine Protected Area	Larger colonies and population, North, SE and SW	
Seychelles	Mahe	Port Launay	Marine Protected Area	Small population	
		Baie Ternay	Marine Protected Area	Larger population, large colonies, scattered within the park, below 20m	
		Baie Lazare	No protection	Small scattered population	



	Inner islands	Petite Soeur	No protection	Small & isolated	
		Grande Soeur	No protection	Small & Isolated	
		Marianne	No protection	Small & isolated	
		Felicite	No protection	Small & isolated	
		Ste Anne, Ile Ronde, Ile Cache, Ile Longue, Moyenne, Ile aux cerf	MPA	Scattered around the park	
	Mahe	Beau Vallon & Belombre	No protection	Small colonies, larger populations, scattered	
		Ile Therese	No protection	Small colonies	
		Conception	No protection	Small colonies	
	Inner islands	La Digue	No protection	Small colonies	
	Mahe	Eden Island	Private, No Protection	Smaller colonies	

1.3 Protection status:

Global Category of Threat: **VU A4cd ver 3.1.**

Justification: listed as vulnerable since 2014, despite being common throughout its range, it is widely harvested for trading in the aquarium industry. Extensive loss of its coral reef habitat has occurred because of a variety of threats. The decline is attributed to combined estimates of destroyed reefs and reef at critical stage of degradation within the range of the coral. Reassessment of the species is needed in 10 years' time, due to threats predicted from climate change and ocean acidification, as stated in the species status assessment (Turak *et al.* 2014).

Conservation actions:

- Protected by Environment Protection Act 1994 (Act 9 of 1994, CAP 71, Parts III, IV, V, VI)
- Protected Areas Act 1991(CAP185)
- National Parks and Nature Conservancy Act 1991 (CAP 141); The National Parks (Ste Anne Marine) Regulations, June 1975, S.I. 58 of 1973, S.I. 35 of 1987, Part II; National Parks (Baie Ternay Marine) (Designation) Order, June 1979,S.I. 54 of 1979;National Parks (Curieuse Marine) Regulations, S.I.15 of 1991; National Parks (Port Launay Marine) Regulations, February 1981, S.I. 9of 1981, S.I. 25 of 1987, Part III & IV

International Conventions

- Convention on Biological Diversity
- Convention on International Trade in Endangered Species of Wild Flora and Fauna
- Nairobi Convention (Protocol for the Protection of the Marine and Coastal Environment (LBSA Protocol – signature 2010), (Protocol on Protected Areas- signature 1985)

Part of the range of the species is located within protected areas (Marine National Parks). Other parts are outside protected areas, and in areas where fisheries are part of traditional activities (Belombre and Beau Vallon), plus around islands which are privately owned (Denis & North islands).

1.4 Ecology, behaviour and habitat requirements:



Pearl bubble corals feed from the surrounding water using its tentacles. Like other corals it also contains zooxanthellae which allow it to convert light into energy that can be used by the coral colony. It is thus made up of a large number of small polyps that form the coral colony.

Feeding by the coral happens at night when its tentacles are extended. During daytime the surface of the colony is covered with a mass of small vesicles that look like small transparent grapes, bifurcated in shape. When the corals are disturbed these vesicles are retracted (Veron, 2000).

Pearl bubble coral, a common and widespread species, tend to occur in shallow areas of tropical reef environment i.e. 18-30°C with optimal temperature at between 23-25°C. Depth varies between 1-20 but can also be found down to 25-27m, as observed at Baie Ternay, Mahe, Republic of Seychelles (lat:-4.633333 and long:55.366667). The species prefer turbid reef environments, but they are found in most habitats occupied by reef structures (Fransen & Holthuis, 2007; Obura *et.al*, 2010; Veron, 2000). Outside of Seychelles, pearl bubble has been recorded at 9-15m in the South China Sea and Gulf of Siam (Titlyanov and Titlyanova 2002).

1.5 Threat analysis:

Human induced threats to coral reefs are numerous. The major threats to coral reef habitats and species include:

- Pollution including pollutant discharge from dredging, and sewage into the sea
- Fuel and oil spills near reefs or onto shallow coral reefs
- Runoff from agricultural activities which result in nutrients from fertilisers ending up in the ocean, and coastal development causing eutrophication which leads to algal overgrowth (Tomascik & Sander, 1985)
- Anchoring on corals
- Fishing nets discarded into the sea which can get entangled on corals, leading to breakage
- Overfishing using fish traps (traditional) reducing grazers causing algal overgrowth on corals
- Malpractice in recreational activities such as snorkelling and diving by careless or untrained tourists which breaks corals
- Trampling by tourists and locals
- Effects of climate change and ocean acidification
- Illegal collection of the species

It is important to ensure that enforcement efforts, especially within Marine Protected Areas, are successful so as to reduce anthropogenic threats to corals and coral reefs. While Marine Protected areas offer some protection to coral reefs, all areas outside of MPAs are used without any significant monitoring to impacts on these resources. For areas outside MPAs, educational signage should be used to encourage proper use of reefs. The legislations available should be used more severely to reduce human impacts on reefs, by making sure that improper usage results in fines, which will encourage people to change the way they use marine resources, especially in Protected Areas.

More mooring buoys need to be installed close to areas where reefs are found, to discourage anchoring on reefs.

It is desirable to continue to educate people on the cost of negative effects on corals to the economy of the country. More research should be carried out on EDGE coral species and other rare corals species, which may have additional functions on reefs e.g. associated with other species (Fransen & Holthuis, 2007). Consequently, it is important to continue to use public education and intensify efforts to create awareness about such rare and genetically important species before they are completely lost.

1.6 Stakeholder analysis:



Country	Stakeholder	Stakeholder's interest in the species' conservation	Current activities	Impact (positive, negative or both)	Intensity of impact (low, medium, high or critical)
Seychelles	PA staffs	Conservation, Research	Practitioners	+	Critical
	NGOs	Conservation, Research	Practitioners	+	Critical
	Visitors (travel agencies, boat charters)	Resource use, commercial	Extractors, users	+/-	High
	Coastal Community (affected and interested)	Resource use - commercial	Extractors, users	-	Medium
	Competing resource users e.g. fishing (boat owner association), mining (SEYPEC), tourism, hotel	Resource use-commercial	Extractors, users	-	Critical
	Government (MoEE)	Conservation	Practitioners, funders	+/-	Critical
	SFA	Research	Practitioners	+/-	High
International	Seychelles Tourism Board	Commercial, conservation	Tourism promotion and Management	+/-	High
	Global Vision International	Conservation, Research	Practitioners	+/-	Medium
International	Zoological Society of London	Conservation	Funders	+	High
	Indian Ocean Commission	Conservation	Support	+	Medium
International	UNDP-GEF	Conservation	Funders	+/-	Critical
	Visiting scientists	Research	Practitioners	+/-	Critical



1.7 Context and background information that will affect the success of any conservation action for this species:

	Description	Barriers to conservation	Opportunities for conservation
Socio-cultural effects and cultural attitudes	<p>Ownership and ability to exploit in own backyard esp. by coastal communities who have lived at the site for many generations.</p> <p>Stakeholders from the private sector are particularly important as they are the primary motor for coastal development. They contribute towards policy as well as standards for development and building. Tourism developers need to be particularly involved.</p>	<p>Legal Actions: creation of protected areas and formulation of laws controlling exploitation and use, law enforcement (e.g. patrols), and habitat restoration efforts</p>	<p>NGOs are important stakeholders as they play an important role in educating and raising public awareness of the importance of environmental conservation and sustainable consumption.</p> <p>Other important stakeholders include the media and professional groups such as engineers, architects and surveyors who can contribute to better management and planning of the coastal zones</p>
Economic implications	<p>Corals and reefs contribute to the traditional fisheries sector as well as provide recreation for tourism, through snorkeling, diving and excursions. Profit from using reefs goes to dive centers, travel agencies etc. and contribute to the local economy</p>	<p>Business developments are expected to place more pressure on the coastal areas of Seychelles. Potential conflicts between users are expected to rise, especially with the growing population and tourism. Degradation of fishing grounds and impacts on coral reefs continue to be a growing issue in the coastal zone.</p>	<p>Tourism development needs to be implemented in accordance with established land use plans in order to ensure orderly development and also aesthetically pleasing and sustainable and environmentally friendly policies, to avoid environmental degradation and other negative environmental impacts.</p>



<p>Existing conservation measures</p>	<p>1. The Seychelles Marine Spatial Planning (MSP) Initiative is a public process focused on planning for, and management of, the sustainable and long-term use and health of the Seychelles Exclusive Economic Zone (EEZ), a marine area covering 1,374,000 km² and 115 islands. It is a government led process, planned and managed by a partnership between the Nature Conservancy and the Government of Seychelles and the United Nations Development Programme --- Global Environment Facility Programme Coordinating Unit, and funded by UNDP-GEF grant and an Oceans 5 grant to the TNC.</p> <p>2. The UNDP-GEF Project “Strengthening Seychelles’ protected area system through NGO management modalities” contract has been signed between the Government of Seychelles (GOS) through the Environment Department (ED) and UNDP in March 2011. The project is being funded by the Global Environment Facility (GEF). Component 1: <i>Strengthened management framework for protected areas in Seychelles;</i> Component 2: <i>Expanded and strengthened management of protected areas in Seychelles.</i> The project has the objective to “<i>Demonstrate effective models for protected area management by non-governmental organisations in the Seychelles, and enable their inclusion into a strengthened protected area system</i>”, in the inner granitic islands.</p> <p>3. Expansion and Strengthening of the Protected Area Subsystem of the Outer Islands of Seychelles and its Integration into the broader land and seascape. To enable biodiversity conservation, the project will</p>	<p>The effect of climate change, such as coral bleaching and changes in oceanographic conditions (in particular winds, and current patterns) will have an increasingly significant bearing on marine resources.</p>	<p>In the absence of concrete scientific evidence, all management measures must be based on a precautionary approach. Resource management efforts can be integrated across sectors and society (Government, NGOs, private sector and the general public) and programmes that strengthen co-management of resources and stakeholders’ involvement in decision making will be developed. New development in hydrocarbon, gas exploration/exploitation must be promoted with a view to minimising environmental impacts, such as marine pollution. NGOs have access to international funding and can implement important research projects pertaining to marine biodiversity and conservation. Regional organizations such as the Indian Ocean Commission (IOC), COMESA (Common Market for Eastern and Southern Africa), SWIOFC (South West Indian Ocean Fisheries Commission) are important partners as they provide technical assistance and funding for important regional projects on marine resource management and fisheries development. Moreover, as a rule, they set the example of good governance and accountability for regional countries to follow.</p>
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	support the official establishment of five new protected areas in the Outer Islands, encompassing 1,237 hectares of terrestrial ecosystems and 76,258 hectares of marine ecosystems. The project will specifically support: (i) an assessment of the current state (biodiversity, infrastructure, management, resource uses, etc.) of the proposed PA units; (ii) the gazetting, boundary setting and zoning of the new PA units; (iii) the strengthening of management structures and the preparation of management plans for each PA Unit, as well as a strategic business plan for four of the PA units; and (iv) the development of functional and well-trained team of PA staff working in collaboration with private sector partners at each new PA unit. (PRODOC signed by Simon Springett for UNDP). The project implementing partner is the ministry of Environment and Energy (MEE) – Department of Environment and is being funded under a UNDP-GEF grant		
Administrative/political set-up	NGOs focused on coastal zones are mainly found at community level. Some NGOs focus on coastal conservation initiatives such as coral reef management. They also organise campaigns to influence public opinion and government position on certain issues.	Pressure from the need to economically develop Seychelles coastal areas	Government facilitates the negotiation and implementation of important coastal management projects
Local expertise and interest	Currently none outside of conservation organisations.	Lack of resource and high turnover so that there is a loss in capacity.	Laws, regulations, plans, stakeholder involvement, monitoring and institutional frameworks should form the basis of ICZM planning. Training/capacity building for local personnel.
Resources		Limiting financial resources for adaptations, management and conservation	Adaptation to climatic risks such as sea level rise, flooding and storm surges, reducing economic cost and losses.



This Survival Blueprint will from here forward deal only with Action Programme ideas of the Seychelles National Parks Authority.

2. ACTION PROGRAMME

Vision (30-50 years)	
Coral reefs are resilient to natural impacts and thrive across its natural range	
Goal(s) (5-10 years)	
Inform and guide management decisions so as to conserve all existing coral reefs, while increasing resilience	
Objectives	Prioritisation <i>(low, medium, high or critical)</i>
1. Protection of all coral species and associated reef species (including EDGE and rare corals)	Critical
2. Research and Monitoring of EDGE coral distribution	Critical
3. Creating awareness on EDGE and rare coral species	Low
4. Enhancing international cooperation between scientific and expert organizations working on research and conservation of EDGE corals in the Western Indian Ocean	Medium
5. Building collaboration between marine research organisation working on coral reef conservation, in the Seychelles	High
6. Collaborating with Dive centres on data collection on coral reefs	High
7. Leading the Seychelles Coral Reef Network for data collection and information sharing in the inner granitics and outer islands of Seychelles	High
8. Establishing rehabilitation and restoration of coral reefs for improved health	Critical



Activities	Country / region	Priority <i>(low, medium, high or critical)</i>	Associated Cost	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Objective 1: Protection of all coral species and associated reef species (including EDGE and rare corals)								
Installation of mooring buoys in Marine Protected Areas	Seychelles	Critical	SCR400000	1 year	SNPA	Functioning mooring buoys installed in all MPAs	Weather hindrance/delay in shipping equipment Opportunities for providing mooring for increased number of boats	Species management, Land and Water protection
Objective 2: Research and Monitoring of EDGE coral distribution								
Deep reef surveys in inner granitics	Seychelles	Critical	SCR70000	1 year	SNPA/GIF/ MCSS	Distribution maps/ survey report	Weather hindrance/lack of staffs to carry out dives	Improving knowledge/capacity building
Reef surveys in outer islands	Seychelles	Critical	SCR200000	2 years	SNPA / SIF/ ICS	Distribution map/ survey report/peer-reviewed paper	Weather hindrance/lack of staffs to carry out dives	Improving knowledge/capacity building
Objective 3: Creating awareness on EDGE and rare coral species								
Designing and producing activity workbook	Seychelles	High	SCR 150,000	1 year	SNPA	Activity workbook	Opportunity to provide resources for environment education in schools	Education and awareness



Activities	Country / region	Priority <i>(low, medium, high or critical)</i>	Associated Cost	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Objective 4: Enhancing international cooperation between scientific and expert organizations working on research and conservation of EDGE corals in the Western Indian Ocean								
Engage with marine research organisation in WIO to carry out research	Seychelles, Mauritius, Rodrigues, Reunion, Madagascar, Comoros, Tanzania, Zanzibar, Kenya	Medium	SCR100000/yr	ongoing	Marine Research organisations, Universities, COI, regional experts	Reports/ Research publications	Lack of commitment	Improving knowledge/
Seek training and exchange opportunities for capacity building of Seychelles researchers	Seychelles, Mauritius, Rodrigues, Reunion, Madagascar, Comoros, Tanzania, Zanzibar, Kenya	Low	SCR50000/yr	ongoing	Marine Research organisations, Universities, COI, regional experts	Number of researchers trained	Lack of commitment	Capacity building



Activities	Country / region	Priority <i>(low, medium, high or critical)</i>	Associated Cost	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Share data and reports on Coral Reef Information System (CRIS)	Seychelles, Mauritius, Rodrigues, Reunion, Madagascar, Comoros, Tanzania, Zanzibar, Kenya	High	SCR5000/yr	Every two years	Marine Research organisations, Universities, COI, regional experts, dive centres, international experts	CRIS reports	Lack of commitment/CRIS not completed	Improving knowledge/species management
Objective 5: Building collaboration between marine research organisation working on coral reef conservation, in the Seychelles								
Carry out research and monitoring of reefs in collaboration with other organisation	Seychelles	Medium		yearly	SNPA / SIF/ ICS/MCSS/UniSey	Report, monitoring programme	Lack of commitment	Species management
Sign and collaborate on Memorandum of Understanding between organisations	Seychelles	High		ongoing	SNPA / SIF/ ICS/MCSS/UniSey	MoUs signed	Lack of commitment	Species management
Objective 6: Collaborating with Dive centres on data collection on coral reefs								



Activities	Country / region	Priority <i>(low, medium, high or critical)</i>	Associated Cost	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Commence a simple monitoring program for coral species in "dive" zones.	Seychelles	Critical		ongoing	DoE/SNPA/SIF/ICS/GVI/local dive centres	Coral Reef Information System(CRIS) Data and Report/ Training workshop reports	Lack of commitment Opportunity for the involvement of dive centres in coral information gathering and sharing	Livelihoods, economics and other incentives/Improving knowledge/capacity building
Involve Dive centres in CRIS data collection and sharing	Seychelles	High		ongoing	SNCRN	CRIS report	Lack of commitment Opportunity for the involvement of dive centres in coral information gathering and sharing	Improved knowledge/capacity building
Objective 7: Leading the Seychelles Coral Reef Network for data collection and information sharing in the inner granitics and outer islands of Seychelles								
Set up the Seychelles National Coral Reef Network	Seychelles	High	SCR100000	2 years	SNPA/DoE/SFA/Nature Seychelles	SNCRN up and running	Lack of commitment	Collaboration and network



Activities	Country / region	Priority <i>(low, medium, high or critical)</i>	Associated Cost	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Create a Conservation Plan for Seychelles Coral reefs	Seychelles	High	SCR200000	1 year	SNCRN/consultant	Conservation Plan	Lack of commitment	Species Management/ Laws and Policies
Objective 8: Establishing rehabilitation and restoration of coral reefs for improved health								
Removal of Crown of Thorn Starfish (COTS)	Seychelles	Critical	SCR100000/yr	4 years	DoE/SNPA/NGOs/Diver centres	End of year Report	Lack of commitment/ Lack of proper equipment Opportunity for collaboration between government and NGOs	Species management
Coral growth and transplantation	Seychelles	Medium	SCR500000	4 yrs	DoE/NGOs/ UNDP/COI/Marine research organisations	Coral sites established	Improper needs assessment Opportunity for collaboration between government and NGOs	Species management/livelihood, economics and other incentives

COI- Indian Ocean Commission, DoE – Department of Environment, GIF – Green Island Foundation, GVI – Global Vision International, ICS – Island Conservation Society, MCSS – Marine Conservation Society of Seychelles, NGOs – Non Government Organisations, SFA- Seychelles Fishing Authority, SIF- Seychelles islands Foundation, SNCRN – Seychelles National Coral reef Network, SNPA – Seychelles National Parks Authority, UNDP- United Nations Development Programme, UniSey – University of Seychelles



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