

## World Heritage Sites

### Protected Areas and World Heritage



## EAST RENNELL SOLOMON ISLANDS

*East Rennell is the eastern end of Rennell Island, the southernmost of the Solomon Island group in the southwestern Pacific. The island is the second largest raised coral atoll in the world, most of which is covered with dense forest. Filling the centre of the site is the atoll's former lagoon, Lake Tegano which is the largest enclosed lake on a Pacific island. The site is also surrounded by a marine zone extending 3 nautical miles out to sea. The island is a stage in the migration and evolution of species in the western Pacific and combined with the strong climatic effects of frequent cyclones, makes a natural laboratory for the study of island biogeography.*

### COUNTRY

Solomon Islands

### NAME

East Rennell

### IUCN MANAGEMENT CATEGORY

IV Managed Resource Protected Area

### NATURAL WORLD HERITAGE SITE

1998: Inscribed on the World Heritage List under Natural Criterion ix.

### BIOGEOGRAPHICAL PROVINCE

Papuan (5.1.13)

### GEOGRAPHICAL LOCATION

The site is the southern two-fifths of Rennell Island, the southernmost of the Solomon Islands which lie on the northern edge of the Coral Sea some 1,000 km east of New Guinea. It is 200 km south of the island of Guadalcanal between 11°39' to 11°43' S by 160°18' to 160°20' E.

### DATES AND HISTORY OF ESTABLISHMENT

There is currently no specific legislation protecting the natural and cultural features of East Rennell. However, the land in traditional customary ownership ensures the sustainable use of its resources

### LAND TENURE

Customary. The government has appointed the East Rennell World Heritage Site Trust Board as administrators of the property. The land around each village is managed according to tribal custom. Lake Tegano is owned in common by the people of its four lakeside villages and is under their common management.

### AREA

The East Rennell land area is 37,000 ha including Lake Tegano (15,500 ha). The area of the surrounding 3 nautical mile marine zone is approximately 58,000 ha. This area is outside the site.

### ALTITUDE

~150m (Tuhungago) to 1,000m below sea level.

## PHYSICAL FEATURES

The Solomon Islands is a group of 992 islands mainly of volcanic origin with basement rocks exposed along a spreading mid-ocean ridge some time between the late Cretaceous and early Eocene. Rennell and Bellona Islands are some 200 km south of the main group well away from the plate collision zone and have a very low degree of seismic activity. They are geologically younger than most of the other islands and have emerged differently. Near the end of the Pleistocene, tectonic movement along a convergent plate boundary raised the seabed in a ridge high enough to allow coral to build the Bellona, Rennell and Indispensable reefs. Their structure and geomorphology indicate that the Rennell Ridge on which they sit is in a phase of active uplift following long subsidence. The whole of Rennell is thought to have been initially deposited as coralline algal limestone and then dolomitized. This dolomitic reef complex was then overlain by younger undolomitized coral limestone. The island is now almost ringed by a narrow fringing reef (Wingham, 1997).

Rennell (*Mu Nggava*) is 86 km long by 14 km wide and 66,000 ha in area nearly surrounded by limestone cliffs between 120-150m high. It is the world's largest uplifted coral atoll after Lifou near New Caledonia, and one of about 25 such atolls in the Pacific, most of which, unlike Rennell where the forests are largely undisturbed, have been modified by human activity. (The pristine World Heritage site of Henderson Island is an exception but is one-tenth the size). Bellona is a 25 ha island 24 km to the northwest. Lake Tegano (*Te'Nggano*) is the largest enclosed lake on a Pacific island. It fills the original lagoon at the east end of the atoll. It is 27 km long, averages 9 km wide and at 15,500 ha occupies nearly a quarter of the island. Its floor is a hard bottomed plain rarely deeper than 40m, covered by several meters of suspended mud. The lake is brackish with a salt concentration maintained by a subterranean connection with the sea. At the west end are some 200 rugged limestone islets (Wingham, 1997). There are no streams or rivers although there are freshwater springs round the lake edge and in places emerging from the coastal cliffs. Groundwater flow is directed from the higher surrounding land into the lake.

The thin soils are derived from weathered coral limestone and occur in small scattered pockets. There has been no soil enrichment by volcanic dust because of the great distance from the larger islands and the direction of the prevailing wind and sea currents. They have a pH range from 6 at 1cm depth to 8.5 at 6cm (Wingham, 1997). High grade phosphates of alumina and iron oxides are found in Bellona. High grade low silica bauxite clays subsequently formed on the reef limestones of west Rennell (PHCG, 2008).

## CLIMATE

The tropical climate of Rennell Island is characterised by high rather uniform temperatures between 22.7°C and 32.2°C and high humidity. The annual rainfall ranges between 3,000mm and 4,000mm and there can be a marked dry period from May to June which may extend to August with a very dry month in July. Southeast trade winds prevail from April to the end of November. The island is in a band of known cyclone paths and is subject to cyclones at relatively frequent intervals between November and April. The latest major cyclone to hit Rennell was Nina in 1993 which caused extensive damage to the forests and villages (Wingham, 1997).

## VEGETATION

Rennell Island is 90% covered by pristine tropical rainforest with a canopy averaging 20 metres high and displaying a number of adaptations to the effects of frequent cyclonic storms. There are three major vegetation types: low mature forest on the karst ridge of the island's perimeter; tall forest of the island interior; and beach flora on the Lake Tekano margins. There are also small patches of mangrove vegetation on the lake margin. The differences in species and structure between the karst ridge and island interior forests result from the different physical conditions on the exposed island margins and the relatively sheltered island interior where deeper soils occur.

The Solomon Islands are a major event in the sequence of decreasing floral diversity from Papua New Guinea eastward across the tropical Pacific. The sequence shows a decline in numbers of genera from about 1,400 in Papua New Guinea to about 260 on Tonga and Niue. The Solomon group contains almost 650 species of vascular plants with 162, or 25% of the total, not occurring on any other island to the east (Wingham, 1997). No endemic tree species have yet been found on the island though there are two endemic species of pandanus, *Pandanus lacustris* and *P. rennellensis*. Ten endemic plants are recorded: the endemic orchid *Dendrobium rennellii* occurs on the small islands of Lake Tegano and the lake's waters contains 312 species of algae and diatoms, some endemic.

## FAUNA

With the exception of Papua New Guinea, the Solomon Islands have a greater diversity of animal species and higher level of endemism than any other Pacific island nation. They have more restricted range and unique bird species by area than any other place on earth. Rennell itself is famous for its many unique species and races of birds and has the highest endemism per hectare of all the islands owing to its isolation and relatively light disturbance by human and alien species such as rats and land snails which have diminished the faunas of other Pacific islands.

The East Rennell site includes all the island's natural habitats and has a viable representation of most of the endemic species of birds. At least 43 species of breeding land and water birds have been identified, 21 being endemic to Rennell: five species and nine subspecies plus seven subspecies endemic to both Rennell and Bellona. Silver-capped fruit dove *Ptilinopus richardsii cyanopterus* is endemic to both islands. Other endemic species include Rennell shrike-bill *Clytorhynchus hamlini*, Rennell fantail *Rhipidura rennelliana*, Rennell white-eye, *Zosterops rennellianus*, bare-eyed white-eye *Woodfordia superciliosa* and Rennell starling *Aplonis insularis*. Little pied cormorant *Phalacrocorax melanoleucos* and Australasian grebe *Tachybaptus novaehollandiae* are common on Lake Tegano.

The site has 11 species of bats including the locally endemic Rennell flying-fox *Pteropus rennelli* (VU). Other bats are the Pacific flying-fox *P. tonganus*, Solomons bare-backed fruit-bat *Dobsonia inermis*, spurred leaf-nosed bat *Hipposideros calcaratus* and Schreiber's long-fingered bat *Miniopterus schreibersii*. There is one destructive alien species, the Pacific rat *Rattus exulans*. Lake Tegano is the only known location for the endemic Rennell Island sea krait *Laticauda crockeri* (VU). The lake's other snake, the yellow-lipped sea krait is *Laticauda colubrina* which often comes on land when not foraging and hides in rock crevices and holes. There are five species of geckos, four skinks, one monitor lizard *Varanus juxtindicus* and three snakes, all of which are widespread in the region. No amphibians have yet been recorded for Rennell Island: this is unusual as the rest of the Solomon archipelago has a rich and peculiar fauna of frogs and toads. This is probably due to the lack of surface water except for the brackish Lake Tegano. Coconut crab *Birgus latro* and two other species of land hermit crabs *Coenobita* spp. occur on the island. Rennell has 27 species of land snails, seven endemic to the island. A total of 731 insects has been recorded from collections made at Rennell and Bellona. Moths (Lepidoptera) have the greatest number of species: 246 in all, with 35 species and 25 subspecies exclusive to Rennell and Bellona (Wingham, 1997).

Around the Solomon Islands 754 species of fish have been recorded and a total of 1,019 reef-dwelling fish. 8 whale species and 9 dolphin species are found in the Solomon Island seas, including resident, migrant and endangered species (IUCN 2003). The Nature Conservancy's Rapid Marine Assessment report in 2004 stated that the Solomon Islands as a group has the second highest diversity of coral species in the world after the Raja Ampat Islands in Indonesia, of over 494 species (PHCG, 2008).

## CULTURAL HERITAGE

Polynesians lived on the archipelago at least 4,000 years ago, and on Rennell Island between 2000 and 1600 BC when people of the Lapita Culture appeared; Bellona Island was briefly occupied by them about 1000 BC. Over a millennium, through long-range canoe voyages, their distinctive pottery was distributed throughout the Pacific from the Bismarck Archipelago in eastern Papua New Guinea to Samoa. The next settlement on the two islands was around 130 BC, with another major occupation in about 1000 AD. The present inhabitants say their ancestors landed on Bellona around 26 generations ago in about 1400 AD and came from Wallis Island (Uvea) north of Fiji (Wingham, 1997).

The Spanish navigator de Gamboa discovered the archipelago in 1568 and the English Captain Boyd in the merchant ship Bellona re-discovered the two islands in 1793. They were little developed until the 19th century when they were subjected to missionaries, blackbirding traders from the Queensland sugarcane fields, and finally to the British government as a protectorate in 1893 which ended in 1978. However, on Rennell, a lack of safe anchorage, the isolation and infertility of the island and shortage of easily obtainable fresh water prevented European settlement and the establishment of trading stations (Wingham, 1997). The name comes from James Rennell, surveyor general of Bengal from 1764 to 1777. The lake was used by both the Japanese and US forces in WW II and saw one day of the battle for Guadalcanal. Subsequently nine Catalina seaplanes were scuttled in the lake where they remain.

## LOCAL HUMAN POPULATION

The population of around 1,500 people in 1999 is of Polynesian origin unlike the rest of the Solomon Islanders who are Melanesian. It has never been large because there is limited fresh water and there are only a few small scattered patches of soil suitable for cultivation. It is also declining through emigration to Honiara on Guadalcanal and plantations on the Russell Islands nearby. About third of the population of East Rennell (approximately 500 people) live in four villages surrounding Lake Tegano. The main kin groups are the sixteen clans, subclans, and patrilineages though the traditional authority of the chiefs is now supplemented by that of Christian pastors. Land is held individually by the men of a lineage and marriage is usually confined to close relations.

The customary village landholding is around 57 sq.km plus hunting areas of around 60 sq.km, which can be shared with other villages. Traditional gardens which provide most of the villagers' subsistence food and cash crops are cultivated for around nine months before being left fallow for four years when the land is cleared and replanted. Crops include yams, taro and pana, slippery cabbage, banana, paw-paw and coconuts. Flying foxes and up to thirteen species of birds are regularly eaten and all villages harvest clams, turtles and sharks. A few take crayfish, dolphin, octopus, coconut crabs and a species of seaweed. In East Rennell fish is a regular part of the diet, mostly *Tilapia mozambica* from the lake introduced by the government around 1957 as an additional source of protein. Local people use portable mills to produce timber, poles and posts for local use; three villages make charcoal. The villagers depend on the forest for ropes and canes, firewood, food, medicine, tapa cloth bark, canoe wood, carving wood and materials for tools, fishing and crafts. Orchids, butterflies and small animals, coral and sea shells are occasionally taken for sale (Wingham, 1997). The island seems to have been relatively unaffected by the civil unrest in the archipelago between 1998 and 2003.

## VISITORS AND VISITOR FACILITIES

Although in 1999 there were no facilities for visitors on the island it has opportunities for bird-watching, botanising, photography and peaceful enjoyment of the country; also snorkelling, bush walks, cultural activities and canoeing. A road linking the west with Lake Tegano was completed in 1995. Small 18-seater planes fly to Rennell three times a week. A cargo ship that takes passengers sails approximately once a month.

## SCIENTIFIC RESEARCH AND FACILITIES

In 1933 the Templeton Crocker expedition discovered many endemic species and in the mid 20th century a team from the Danish National Museum studied the people and culture. The island has since been studied as part of eight major scientific expeditions. The first published quantitative report, in 1994, was a rapid ecological survey of the fringing reefs of Rennell Island and the Indispensable Reefs to assess habitat types, biodiversity, and the abundance, density and condition of commercially important species of reef fish. A second major assessment, of the marine resources of the whole archipelago, took place in 2004 done by some ten agencies led by the Nature Conservancy. This established that the Solomon Islands was part of the Coral Triangle which has the world's highest marine biodiversity but that commercial species had been overfished. A comprehensive list of scientific papers on the fauna and flora of the island was given in the nomination document by Wingham (1997). There are no scientific facilities on the island.

## CONSERVATION VALUE

Rennell is the world's second largest raised coral atoll and has the largest lake in the insular Pacific, pristine forests uninvaded by alien pests and a fringing reef. It is famous for the many unique species and races of birds developed due to its isolation and has the highest endemism in the Pacific for an island of its size. East Rennell includes all the island's habitats and a viable representation in natural conditions of most of the endemic bird species (Wingham, 1997). The site's marine, coastal and forest characteristics are as well or better displayed elsewhere in the Papuan biogeographical province, but it combines all three in one relatively undegraded location which is also within a WWF Global 200 Eco-region and a BirdLife-designated Endemic Bird Area.

## CONSERVATION MANAGEMENT

The Wildlife Protection and Management Act of 1998 governs the conservation of the site and the local people helped to prepare the East Rennell Resource Management and Conservation Plan with input from the Tegano Management and Conservation Committee, the Rennell and Bellona provincial representatives, the Council of Chiefs and the Paramount Chief. The Plan was approved in 2007 with the Ministry of Forests, Environment and Conservation responsible for reviewing it. The government has appointed the East Rennell World Heritage Site Trust Board drawn from local people, including

women, to manage the property. The Tegano Management and Conservation Committee of elected local stakeholders establishes the harvesting rights of resource owners and users, and also screens small business applications to ensure their sustainability. Monitoring is occasional. Problems involving land or reef ownership are referred to the Council of Chiefs and the Paramount Chief who have traditionally determined management based on customary law. Enforcement measures are very effective against outsiders who take natural resources but less so against locals who have harvesting rights (Devi & Wingham, n.d.). The local peoples' understanding of environmental factors and their desire to generate income through ecotourism combine to protect the area which is in any case sparsely populated pristine rain forest very little modified by logging and shifting cultivation. But there is a need for education and training in management and cooperative decision-making to improve the effectiveness of this approach (Wingham, 1997). Businesses which have been encouraged by foreign advisors are beekeeping, ecotourism, marketing of local weaving and carving, sea fishing, poultry keeping, vegetable farming and some furniture production. Two proposals rejected were the export of lake eels and reef fish because this was not sustainable (Devi & Wingham, n.d.).

### **MANAGEMENT CONSTRAINTS**

During the extension in 1995 of the road from Lavanggu to the lake end, timber trees were removed from both sides of the road, most of which was used for rebuilding houses after cyclone Nina. Many mature trees were blown down by the cyclone, creating gaps in the forest canopy which has allowed increased growth of the vine *Meremia peltata* which appears to be degrading the forest. A small number of terrestrial mammals have been introduced and a few pigs and goats have become feral. Some households have cats and education is needed so that they do not become a problem (Wingham, 1997). However, any increase in population and cropping may lead to freshwater stress, reduced soil fertility and crop yields, and in the less protected half of the island, logging, mining and overexploitation of coconut crab and marine resources. With stresses induced by climate change this may in future highlight any weaknesses in institutional capacity, in the legal framework and in the lack of clear policy directives to safeguard the environment. The forest itself, though dense, is not large enough to sustain its endemic bird populations over the long term without its continuation in the western half of the island, and commercial logging could threaten it.

### **STAFF**

Local bodies such as the Tegano Management Conservation Committee, and the local villagers under their chiefs provide management based on traditional practices for sustainable use.

### **BUDGET**

Australian and New Zealand Bilateral Aid Programs have provided funding and advice. In 2006 US\$26,350 was provided from international sources for the preparation of management plan but funding for further work is not yet available. The Australian Aid Agency is to support a heritage and governance capacity-building project in the Solomon Islands which may provide assistance in management (IUCN, 2008).

### **LOCAL ADDRESS**

Director of East Rennell Tourism Division, Department of Commerce, Employment & Tourism, P.O.Box G26, Honiara, Solomon Islands.

Paramount Chief of East Rennell, c/o Tigoo, West Rennell, Solomon Islands.

### **REFERENCES**

The principal source for the above information was the original nomination for World Heritage status. Some of the principle references listed in Wingham (1997) included as follows:

Birket-Smith, K.(1956). *An Ethnological Sketch of Rennell Island: A Polynesian Outlier in Melanesia*. Det Kongelige Danske Videnskabernes Selskab, Historiskfilologiske Meddelelser Bind 35, no. 3. Danish Natural Museum, Copenhagen.

Birket-Smith, K. (1966). *Language and Culture of Rennell and Bellona Islands*. Danish Natural Museum, Copenhagen.

Cogger, H. *et al.* (1987). The status and natural history of the Rennell Island sea krait, *Laticauda crockeri* (Serpentes: Laticauda). *Journal of Herpetology* 21: 255-266.

Devi, B. & Wingham, E. (1998.). *Solomon Islands. Involvement of Local People in Management of a Proposed World Heritage Site at East Rennell, Solomon Islands*. Ministry of Commerce, Employment and Tourism, Honiara, Solomon Islands.

Diamond, J. (1984). The avifauna of Rennell and Bellona Islands. In Wolff, T. (ed.) *The Natural History of Rennell Island, British Solomon Islands*. University of Copenhagen, Danish Science Press. Pp. 127-168.

Flannery, T. (1995). *Mammals of the South-west Pacific and Moluccan Islands*. Imago Productions. Singapore.

Grover, J. (1960). The Geology of Rennell and Bellona Atolls: the Great Uplifted Atolls on the Edge of the Coral Sea. In Wolff, T. (ed.) *The Natural History of Rennell Island, British Solomon Islands*. University of Copenhagen, Danish Science Press. Pp. 103-119.

IUCN (2009). *The IUCN Red List of Threatened Species*. Gland, Switzerland & Cambridge, U.K.

----- (2008). *State of Conservation Report East Rennell (Solomon Islands)*. Gland, Switzerland.

----- (1998). *World Heritage Nomination - IUCN Technical Evaluation. East Rennell (Solomon Islands)*. IUCN, Gland, Switzerland.

Pacific Horizon Consultancy Group (PHCG) (2008). *Solomon Islands State of Environment Report 2008*. Report for the Ministry of Environment, Conservation & Meteorology, Honiara, Solomon Islands.

Pegler, J. (1996). *A Bird Study at Rennell Island, Solomon Islands*. Unpublished.

Stattersfield, A., Crosby, M., Long, A. & Wege, D. (1998). *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. Birdlife International, Cambridge, United Kingdom.

Wingham, E. (1997). *Nomination of East Rennell, Solomon Islands for Inclusion in the World Heritage List - Natural Sites*. New Zealand Official Development Assistance Programme, Ministry of Foreign Affairs and Trade. 47 pp.

website <http://www.commerce.gov.sb/Tourism/RennellandBellona.htm>.

Wolff, T. (ed.). (1958). *The Natural History of Rennell Island: Vol. 3*. Danish Science Press, Copenhagen.

----- (1958). Vascular Plants from Rennell and Bellona Islands, in Wolff, T. (ed.). *The Natural History of Rennell Island. Vol 3*. Danish Science Press. Copenhagen..

**DATE:** February 2000. Updated March 2009, May 2011.