



Solomon Islands Saltwater Crocodile Conservation and Management Plan



Reduce the risk of crocodile attack on people, while ensuring the long-term conservation and management of the species based on science, culture, and traditional knowledge for sustainable utilisation

2023–2027



Prepared by: Ministry of Environment, Climate Change, Disaster Management and Meteorology and Ministry of Fisheries and Marine Resources

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**Solomon Islands Saltwater
Crocodile Conservation and
Management Plan
2023–2027**

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Acronyms

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CITES MA	Convention on International Trade in Endangered Species of Wild Fauna and Flora Management Authority
CITES SA	Convention on International Trade in Endangered Species of Wild Fauna and Flora Scientific Authority
CLO	Community Liaison Officer
CMC	Crocodile Management Coordinator
ECD	Environment and Conservation Division
IUCN	International Union for the Conservation of Nature
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MFMR	Ministry of Fisheries & Marine Resources
RSIPF	Royal Solomon Islands Police Force
SPREP	Secretariat of the Pacific Regional Environmental Programme

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Foreword

The saltwater crocodile (*Crocodylus porosus*) is now widespread throughout the Solomon Islands after recovering from unregulated commercial hunting that occurred until its protection in 1993. The species has a cultural significance in Solomon Islands society and features prominently on the national coat of arms. It inhabits most tidal and non-tidal coastal waterways, where it often comes into conflict with people who also live in these environments.

Internationally, the species is highly valued for its skin, however the export of skins from the Solomon Islands was banned under the Fisheries Act in 1993 and is not allowed due to its Appendix I listing under CITES. This protection allowed the wild population to recover, which has resulted in increased human-crocodile conflict.

This first ever Crocodile Management Plan for the Solomon Islands is crucial for managing the increasing crocodile population and human-crocodile conflict.

This Plan outlines the broad framework for managing the risks posed by crocodiles on humans whilst ensuring the conservation of this species in the longer term. To achieve this, the economic, ecological, social, and cultural values of the species must be realised to offset the negative perceptions about increasing conflict.

The vision of this plan is to *'reduce the risk of crocodile attack on people, while ensuring the long-term conservation and management of the species based on science, culture and traditional knowledge, and through sustainable utilisation'*. This vision has been translated into five key areas – response and removal of problem crocodiles, education and awareness, crocodile population monitoring, working towards the commercial use and export of crocodile products, and centralised and structured reporting and coordination.

This plan will help us work together to sustainably manage saltwater crocodiles in Solomon Islands.



A handwritten signature in black ink, appearing as a stylized, cursive 'S'.

Hon. Stanley Sofu

Minister for Ministry of Environment,
Climate Change, Disaster Management and
Meteorology



A handwritten signature in black ink, consisting of several overlapping loops and lines.

Hon. Nestor Giro

Minister for Ministry of Fisheries & Marine
Resources

Executive Summary

- The saltwater crocodile (*Crocodylus porosus*) is widespread throughout the Solomon Islands and the population has recovered from historical commercial harvest. Increasing numbers of crocodiles and humans have led to increasing human-crocodile conflict, including attacks, and leading to community concern. This management plan addresses those concerns and provides the framework for crocodile management in the Solomon Islands moving forward.
- The saltwater crocodile (*Crocodylus porosus*) is the largest and most wide-ranging species of crocodylian (Webb et al. 2010, 2021). It is considered the most territorial and least tolerant of conspecifics (Webb and Manolis 1989) and is responsible for some of the highest number of attacks on humans throughout its range each year (Webb et al. 2010, 2021).
- The saltwater crocodile (*Crocodylus porosus*) population in the Solomon Islands is currently listed under Appendix I of CITES and was listed on schedule I of the *Wildlife Protection and Management Act 1998 (WPM Act 1998)*, which prohibits export, other than for scientific purposes under permit.
- Solomon Islanders have a strong, complex and diverse cultural connection with the saltwater crocodile, reflected in its inclusion on the country's coat of arms (Van der Ploeg et al. 2019).
- The Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) and the Ministry of Fisheries and Marine Resources (MFMR) are responsible for the management of saltwater crocodiles in the Solomon Islands.
- The *Solomon Islands National Biodiversity Strategic Action Plan 2016–2020* identified the need to develop a management plan for saltwater crocodiles (MECDM 2016: Strategic Goal C, target 13B I).
- Between 2008 and 2017, 225 crocodile attacks on people were known, of which 83 were fatal (37%), including 31 children (Van der Ploeg et al. 2019). The rate of fatal attacks (5 per year) has been increasing over time and this trend was expected to continue as the human and crocodile populations (4 % per year) continue to increase.
- The aim of this management plan is for long-term conservation and management of saltwater crocodiles and their habitat through sustainable use and by reducing the risk posed by saltwater crocodiles to the community.
- The core objectives are centred around Response and Removal, Education and Awareness, Research and Population Monitoring, Commercial harvest and export, and Reporting and Coordination, which are underpinned by guiding principles of Governance and Research, Legal instruments, Stakeholder Partnership, Cultural Heritage, Safety, and protection of human life.
- The Plan identifies human-crocodile conflict hot-spots and defines a 'problem crocodile', which is essentially any crocodile that poses a threat to human safety, and other animals, including livestock.
- The process involved with assessing and removing a problem crocodile under this Plan involves recording details of the incident, reporting to local authorities, who then assess whether the crocodile is a problem and requires removal, alerting the local community, and removing the crocodile if required, in consultation with the local community.
- Consideration of alternative management options and the development of a more detailed Response and Removal Plan which takes into consideration local cultural considerations and logistical challenges is recommended.
- Given the strong cultural connection between humans and crocodiles in the Solomon Islands, it is important to consider and integrate traditional ecological knowledge and cultural values into education and awareness – so that people can be 'SI Crocwise' – and capture this in a National Crocwise Education and Awareness Plan.



- There are several ways to minimise the risk of crocodile attack based on knowledge of environmental, seasonal, ecological, and behavioural factors.
- Ongoing monitoring of the crocodile population and extent of human-crocodile conflict, through a structured and coordinated Population Monitoring Plan, will allow objective assessment of trends over time.
- Given the relatively small wild population size within the Solomon Islands, options for potential commercialisation will be carefully considered.
- Before any products from wild crocodiles can be exported from the Solomon Islands, a proposal will need to be made to CITES to transfer the Solomon Island population of *Crocodylus porosus* from Appendix I to Appendix II, based on the population recovery that has taken place.
- The reporting and centralised coordination of all crocodile management activities is considered crucial to the success of the management programme. As such a Reporting and Coordination Plan should be developed that provides the framework for establishing community-based liaison officers (CLOs), what information will be collected and in what format, and how it will be coordinated.
- It is important to further enhance the skills, knowledge and capacity of enforcement, management, education, and scientific authorities, including the Royal Solomon Islands Police Force (RSIPF), MECDM, MFMR to better identify, communicate and implement control and response measures regarding problem crocodiles, disseminate crocodile safety information, and undertake population monitoring.
- A review of this management plan should be done every five years, or sooner if required, and focus on progress against the objectives. It should also consider any legislative or administrative changes that may affect the plan.



Definitions

CITES. Convention on International Trade in Endangered Species of Wild Flora and Fauna signed at Washington, D.C., on 3rd March 1973, and entered into force on 1 July 1975. There are currently (2023) 184 Parties.

CITES I. Species listed on Appendix I of CITES. Wild populations considered threatened with extinction by trade. International trade in wild specimens, or any part of them or product made from them, for commercial purposes, is prohibited. International trade for non-commercial purposes (education, scientific, research, species conservation) is permitted. The progeny of closed-cycle commercial captive breeding operations, registered with the CITES Secretariat, can be traded internationally, and are treated as Appendix II specimens.

CITES II. Species listed on Appendix II of CITES. Species not currently threatened with extinction in the wild due to trade but could become so unless international trade is strictly regulated. Includes “look-a-like” species, difficult to identify in trade from Appendix I specimens. International Trade is permitted subject to CITES protocols.

CITES MA or “Management Authority”. The national government agency in Solomon Islands, established under the WPM (Amendment) Act 2017, as the designated Solomon Islands CITES Management Authority in accordance with Article IX of CITES, responsible for issuing permits or certificates for trade in CITES-listed specimens from or to the Solomon Islands. In Solomon Islands it is the Ministry of Environment Climate Change Disaster Management and Meteorology (MECDM).

CITES SA or “Scientific Authority”. The national government agency in Solomon Islands established as the CITES Scientific Authority under the WPM (Amendment) Act 2017, as required by Article IX of CITES, and who are responsible for providing scientific advice to the CITES MA, particularly about ensuring trade is not detrimental to the survival

of the species in trade. In Solomon Islands it the Ministry of Fisheries and Marine Resources

Commercial purposes. Means to trade or to make a profit on the disposal or receipt of an animal specimen or plant specimen.

Conference of the Parties (CoP). Biennial meetings of the Parties (States) whose membership to CITES has come into force (184 Parties in 2023). Solomon Islands joined CITES on 26 March 2007 and acceded to CITES 24 June 2007.

Conservation. Refers to protection and management of the species and its habitats while also considering its risk and threats to human life and livestock, where appropriate management measures and procedures are adhered to.

Crocodile. Unless otherwise specified, in this report, the term refers exclusively to saltwater crocodiles (*Crocodylus porosus*).

Endangered. Threatened with extinction. Species whose ongoing survival in the wild, in the Solomon Islands, is definitively in doubt, due to any cause, including excessive harvest. Or species whose global populations are included in the general risk categories of the IUCN Red List of Threatened Species, which may or may not be threatened in the Solomon Islands.

Export. Shipment of specimens obtained in Solomon Islands to other countries.

Licence. Includes a licence or other form of authorisation required under the *Fisheries Management Act 2015* or a Fisheries Management Plan, including a licence issued by an Administrator. “Licensed” and “licensee” have corresponding meanings.

Licence fee. Means the prescribed fee for licences issued under the *Fisheries Management Act 2015*.



Management Programme. Management programme declared under section 6 to be an approved management programme of WPMA 1998.

Permits and Certificates. Permits or certificates required to comply with national laws and CITES under the provisions of Articles III, IV and V of CITES.

Permit. Includes both:

(a) a permit to trade in a CITES specimen issued under section 3H of WPM (Amendment) 2017- for Part 2; and

(b) a permit to trade in a non-CITES specimen issued under section 14 of the provisions of WPMA 1998 for Part 3.

Problem crocodile. Crocodiles identified as posing an unacceptable risk to the safety of the public or their livestock and pets.

Re-Export. The transshipment of specimens that have been imported into the Solomon Islands.

Species. Any species, subspecies, or geographically separate population of a particular species.

Specimen. Can include:

(a) any animal or plant, whether live or dead;

(b) for species in Appendices I and II, any readily recognisable part or derivative thereof;

(c) for species in Appendix III, any readily recognisable part or derivative thereof specified in the Appendix III listing in relation to that species.

Trade. In a specimen, means export, re-export, import and introduction from the sea.

Wildlife. means terrestrial or marine flora and fauna.

Background

The saltwater crocodile (*Crocodylus porosus*) is widespread throughout Solomon Islands and the population has recovered from historical commercial harvest. Increasing numbers of crocodiles and humans have led to increased human-crocodile conflict, including attacks. This resulted in rural communities, leaders and the media to call for national authorities to lift the ban on commercial export to provide economic benefits to the community, and to impose control measures, such as the removal of problem crocodiles that pose a high risk to human safety. This management plan addresses those concerns and provides the framework for crocodile management in Solomon Islands moving forward.

Government Priority

Since 2012, the development of a strategic plan for managing saltwater crocodiles was identified as one of the Government's key priorities. The following key documents have informed the development of the saltwater crocodile management plan (including environmental legislations, see Appendix 1):

- MECDM Corporate Plan 2018–2020. Priority focus is on biodiversity research and non-detrimental findings for species conservation and management (2018/19 Key Output): establish research & data (Non-Detrimental Finding) for concern species including crocodiles.

- The Solomon Islands National Biodiversity Strategic Action Plan 2016–2020 identifies the need to develop a management plan for saltwater crocodiles (MECDM 2016: Strategic Goal C, Target 13B I).
- Fisheries Management Regulations of 2018 banned the export of crocodiles or products derived from them.

The national government authorities identified several key requirements for improved management of the saltwater crocodile in the Solomon Islands:

- Improve knowledge and undertake a scientific study of the population size, status and distributions, with the long-term goal of moving the species from CITES I to CITES II to enable possible ranching and trade.
- Establish a system to address and manage crocodile–human conflicts (Protocol for removal and keeping its derivatives, etc.)
- Raise awareness (cost-effective means for awareness and reaching isolated communities) and safety measures/means.
- Develop a National Management Plan/Committee for crocodile management.

The first national survey of the crocodile population and human–crocodile conflict conducted in 2017 sets the basis to expand the need to develop the national management plan.



Geographical context

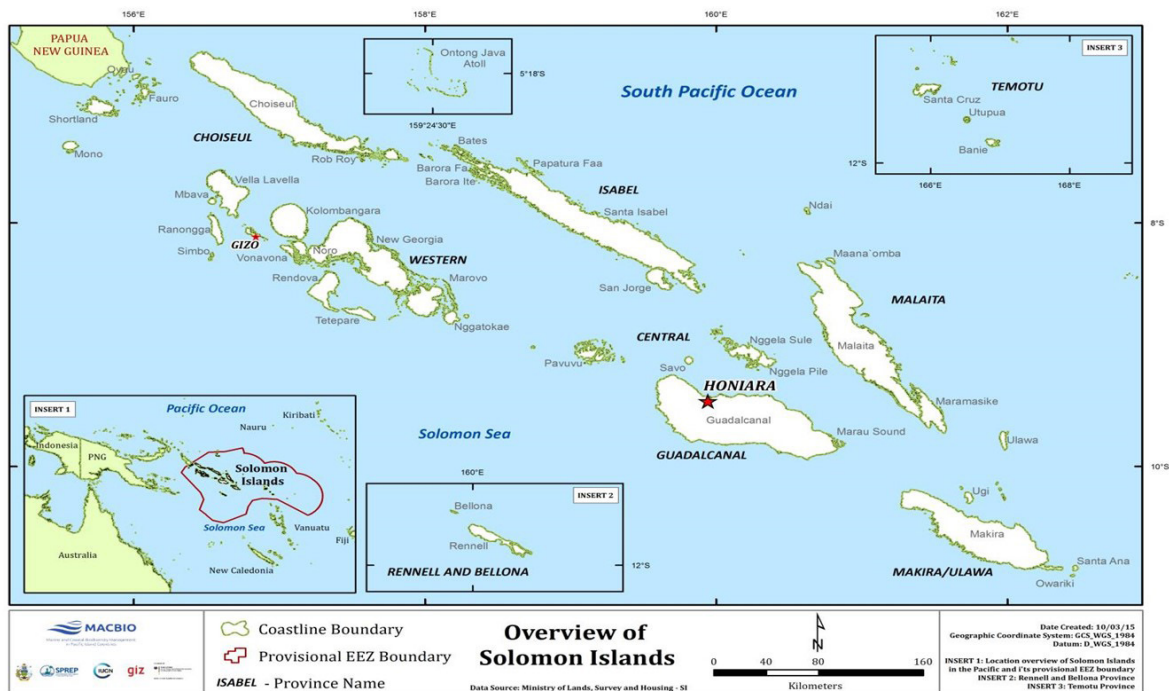


Figure 1. Map of Solomon Islands. (MACBIO 2018)

Physical geography

The Solomon Islands archipelago in the southwest Pacific is located east of Papua New Guinea. There are six major island groups; Choiseul, Guadalcanal, Malaita, Makira, New Georgia, and Santa Isabel and approximately 990 small islands, atolls and reef (see Figure 1). The islands are characterised by tropical rainforests and rugged mountains intersected by deep, narrow valleys. Solomon Islands is also known as one of the largest ocean states in the Pacific, with an area of 1,589,477 km². Solomon Islands consists of about 9,880 km of coastline and 30,407 km² of land.

Biodiversity

The Solomon Islands archipelago is part of the Eastern Melanesian Islands and is recognised as an important biodiversity hotspot that contains high species richness and endemism (CEPF 2012; Figure 1). It also has one of the

largest and most diverse marine habitats in the world (CTI 2012), including 3,591 km² of coral reef, 650 km² of mangrove forests (31 species = half of world species), and 100 km² of sea grass beds (10 species = 80% of known sea grass in the Indo-Pacific region). The coastal waters of Solomon Islands are rich in marine biodiversity with several species of whale (n=8), dolphin (n=9), dugong, marine turtle (n=5), and the saltwater or estuarine crocodile (*Crocodylus porosus*), and over 1000 fish species.

Saltwater or estuarine crocodile (*Crocodylus porosus*) – regional context



Figure 2. Map showing regional distribution of saltwater crocodile © Mathew Brien

Status and distribution

The saltwater crocodile (*Crocodylus porosus*) is the largest and most wide-ranging species of crocodylian (Webb et al. 2010, 2021). It is distributed from India in the west, throughout south-east Asia, Indonesia, down through Papua New Guinea and northern Australia in the south, and across to Vanuatu in the east (Webb et al. 2010, 2021). The species has recovered from widespread over-exploitation and is now estimated at 400,000 non-hatchlings, with Indonesia, Papua New Guinea and Australia considered strongholds for the species (Webb et al. 2010, 2021). The global population of *C. porosus* is currently listed as Least Concern by the IUCN Red List (Webb et al. 2021).

Habitat

Saltwater crocodiles are found throughout tidal and non-tidal sections of rivers, lakes and wetlands as far as 100 km inland, and in some cases at elevations over 400 m (Brien et al. 2017, Webb et al. 2010). They typically use the ocean to move between river systems and can also be found on offshore islands. The species is capable of long-distance movement and has a well-defined homing ability. Adult males have been recorded as travelling hundreds of kilometres between different locations, and individuals relocated for management can return to their place of capture even if separated by long distances (Read et al. 2007, Campbell et al. 2013, Fukuda et al. 2019).



Biology and behaviour

Wild adult males reach sexual maturity at 3.6 m in length and can grow to 6 m – 7 m (1000 kg) while females reach sexual maturity at ~2.2 m, and typically reach a maximum length of 3.5 m (Webb and Manolis 1989). Females build a mound nest during the warmer, wet season and typically produce around 50 eggs, which take between 80 and 90 days to hatch (Webb et al. 1983). Sex is determined by incubation temperature, with all males at constant 32°C, and a mix of males and females at higher and lower temperatures (Webb and Manolis 1989). The female will usually protect the nest and hatchlings from intruders, sometimes up to three months post-hatching.

The saltwater crocodile is considered a cryptic, water's edge predator that opportunistically feeds on a wide range of prey, including crustaceans, fish, insects, reptiles and birds, shifting to larger prey such as mammals as they reach sizes of ~2 m in length and greater (Webb and Manolis 1989). It is at this stage that they

start to pose a serious threat to livestock, pets and humans – especially children.

Human-crocodile conflict

The species is considered the most territorial and least tolerant of conspecifics (Webb and Manolis 1989) and is responsible for some of the highest number of attacks on humans throughout its range each year (Webb et al. 2010, 2021). Management programmes typically involve the removal of problem crocodiles, public education and awareness, and research and monitoring. The sustainable use of wild populations in places such as Indonesia, Papua New Guinea and Australia involves the ranching of eggs and juveniles to supply the commercial skin trade (Webb et al. 2021). These programmes have been effective in providing local people with economic benefits and incentives to tolerate increasing populations of such a large predator.

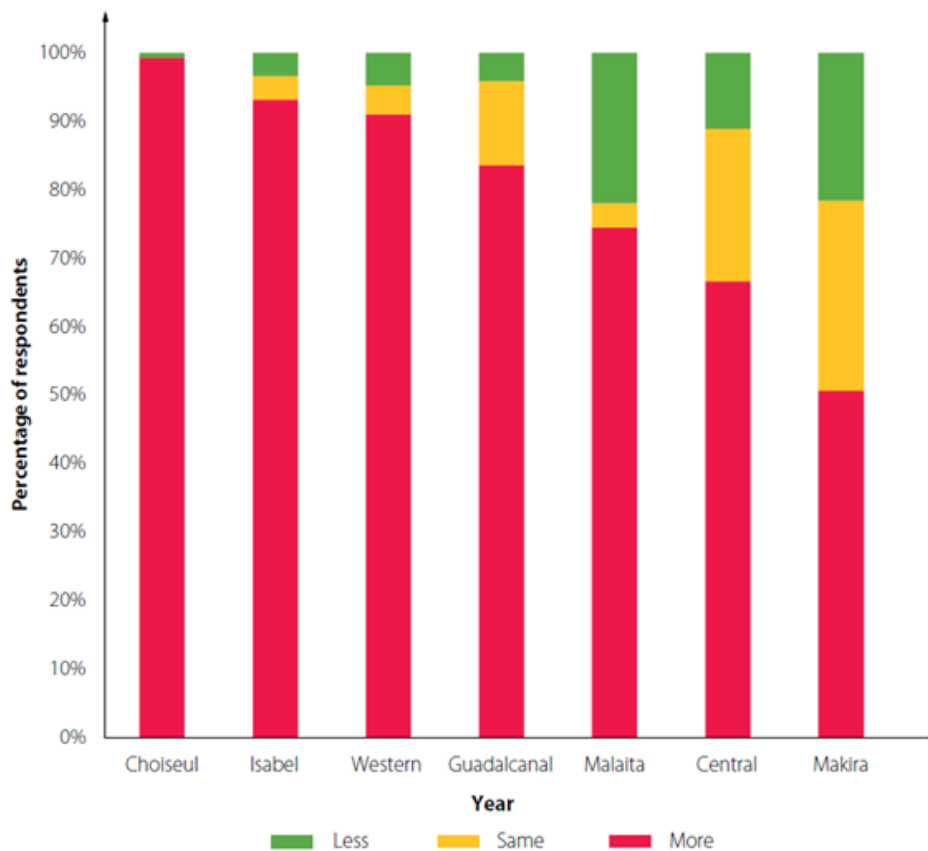


Figure 3. Solomon Islands respondent perception of crocodile population over the last 10 years (Source: Van der Ploeg et al. 2019)

Saltwater crocodiles in Solomon Islands – local context



Figure 4. Saltwater crocodile in captivity © J. Viravira/ECD

Conservation status

The saltwater crocodile (*Crocodylus porosus*) population in Solomon Islands is currently listed under Appendix I of CITES and was listed on Schedule I of the *Wildlife Protection and Management Act* 1998, which prohibits export, other than for scientific purposes under permit. However, the legislation does allow for the killing of crocodiles under traditional or *kastom* law for food, rituals or when a crocodile poses a risk to human safety. The primary threats to the viability of the saltwater crocodile population in Solomon Islands include overharvesting, habitat destruction, human encroachment, and deaths resulting

from increased human-crocodile conflict.

Distribution and population size

Solomon Islands represents the easternmost breeding population of the species, where it is known to occur throughout most tidal and non-tidal coastal waterways (McCoy 1980, Messel and King 1990, Van der Ploeg et al. 2019). By the late 1980s, the wild population was seriously depleted from widespread and unregulated commercial harvest to supply the international skin trade – principally in Japan. In 1989, the population was estimated at only 720 crocodiles (Messel and King 1990). However, since protection



in 1993, the population has been increasing at a rate of ~4 per cent per year and is currently estimated at 1,400–2,300 non-hatchling crocodiles (Van der Ploeg et al. 2019; Figure 3).

The highest numbers were reported in Western Province (466–755), Isabel (274–501), Central Province (180–267) and Choiseul (176–283), with smaller populations in Malaita (145–246), Guadalcanal (90–143) and Makira (54–100) (Van der Ploeg et al. 2019). Nesting has recently (2016–2019) been reported in all provinces, with the majority in Western Province (Van der Ploeg et al. 2019). A systematic and coordinated system of monitoring will be required into the future to detect changes through time and inform the management programme.

Crocodiles are present in rivers, lakes, coastal areas and mangrove forests including non-tidal habitats across Solomon Islands. Examples of some of the crocodile habitats are shown in Figures 5 and 6.

Cultural significance

Solomon Islanders have a strong, complex and diverse cultural connection with the saltwater crocodile, reflected in its inclusion on the country's coat of arms (Van der Ploeg et al. 2019). Crocodiles are widely considered taboo or 'kastom' animals – ancestors that protect their human descendants and keep evil spirits at bay (Van der Ploeg et al. 2019). It is believed they should be treated with respect and should not be killed or eaten. When attacks on humans do occur, they are either attributed to the wrath of ancestors or sorcery or are seen as a violation of the totemic contract which requires retribution (Van der Ploeg et al. 2019). In some areas, including Makira, crocodiles are not considered kastom at all and are instead hunted for food. Cultural relationships with crocodiles have eroded over time; they persist in the more remote communities and are an essential consideration when managing the species in the Solomons (Van der Ploeg et al. 2019).

In Malaulalo Island, one of the Three Sisters Islands in Makira Province, a strong cultural relationship between people and crocodiles still exists, with local custodians performing ceremonial 'crocodile calling' to catch crocodiles to eat as a prized source of meat (Marita, per.com, 2022). Tribal groups have blended these cultural relations with local community conservation initiatives in Three Sisters since 2010.

Solomon Islands coat of arms

The Solomon Islands coat of arms comprises of a shield, which is framed and supported by two of the most iconic and culturally important marine animals in the nation – the crocodile (on the right) and the shark (on the left). In addition, the turtle represents the western District (now refers to the Western Province and Choiseul Province), the shields and spears represent the Central District (now refers to Isabel Province, Central Islands Province, Rennel & Bellona Province and Guadalcanal Province), the eagle and war clubs represent Malaita District (now refers to Malaita Province and includes MOI–Malaita Outer Islands–Lord Howe and Sikaiana Island Groups), and the frigate birds represent the Eastern District (now refers to Makira/Ulawa Province and Temotu Province). The depiction of these animals, including the crocodile, demonstrates how significant they are to Solomon Islands culture and belief systems.



Figure 5. A popular crocodile lake in Malaulalo Island (Three Sisters Islands), Makira Province © V. Pulekera/ECD/MECDM



Figure 6. Tige River mouth at Tige village, Marovo Lagoon, Western Province. © V.Pulekera/ECD/MECDM

Human-crocodile conflict

The Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM) and the Ministry of Fisheries and Marine Resources (MFMR) are responsible for the management of saltwater crocodiles in Solomon Islands. While the Royal Solomon

Islands Police Force (RSIPF) occasionally respond to and remove problem crocodiles by shooting them at the request of village authorities, in most cases local hunters trap and kill problem crocodiles (see Appendix 2 for details). However, there has never been a formal or structured approach to crocodile management in the country.



The Solomon Islands National Biodiversity Strategic Action Plan 2016–2020 identified the need to develop a management plan for saltwater crocodiles (MECDM 2016: Strategic Goal C, target 13B I). Obtaining updated information on the distribution and abundance of the wild crocodile population, and the extent and nature of human-crocodile conflict in the country was an initial priority. In 2017, following growing public concerns about saltwater crocodile attacks on people, the MECDM, MFMR and WorldFish conducted a nationwide survey of the crocodile population and collected detailed information on human-crocodile conflict (Van der Ploeg et al. 2019).

Between 2008 and 2017, 225 crocodile attacks on people were known, of which 83 were fatal

(37%) including 31 children (Van der Ploeg et al. 2019). In 2017 alone, there were more than 10 crocodile attacks on people, as well as dozens more on livestock and domestic animals. In response, the RSIPF reportedly shot a total of 27 problem crocodiles across four provinces, and another 29 in the first half of 2018 (Van der Ploeg et al. 2019). The real number of attacks was considered far greater, as those in remote rural areas often go unreported. The rate of fatal attacks (5 per year) has been increasing over time and this trend was expected to continue as the human population (from 339,000 in 1993 to 628,000 in 2018) and crocodile populations (4% per year) continue to increase (Figure 3).



Figure 7. A juvenile crocodile (0.45 m) kept in an enclosure © V. Telena/MFMR

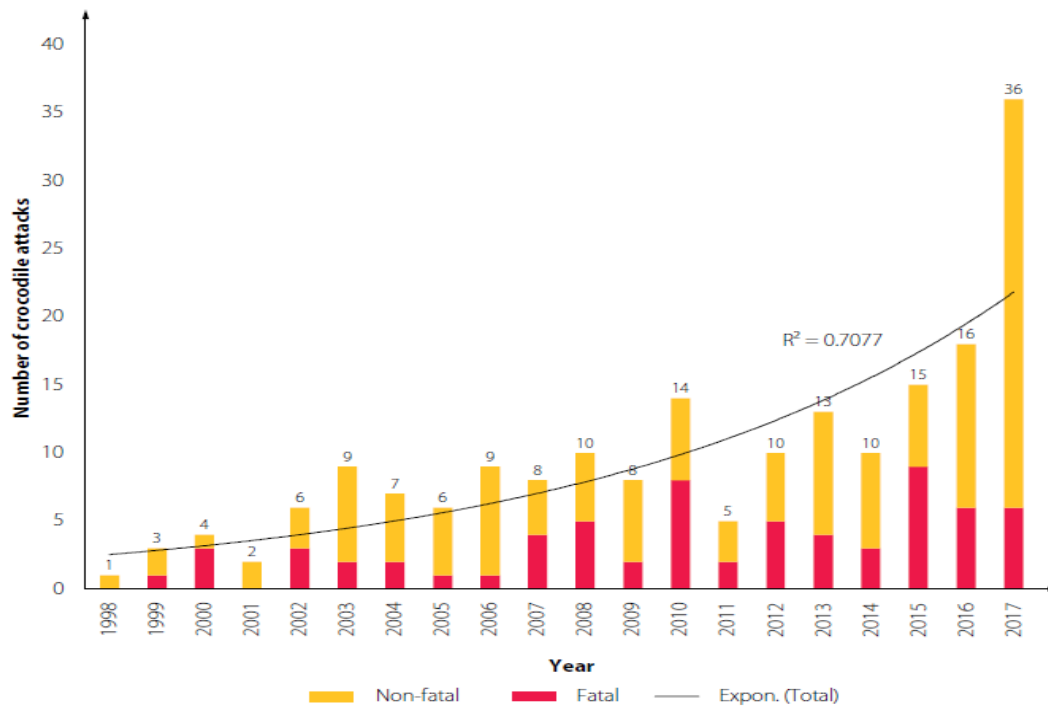


Figure 8. Reported number of saltwater crocodile attacks on humans 1998–2017. (Source: Vander Ploeg et al. 2019)

The Van der Ploeg et al. (2019) report stated that ‘ensuring the safety of people should be the main goal of a national saltwater crocodile management plan’ in Solomon Islands. The report also provided a series of key recommendations including, to raise public awareness about crocodile safety, destroy problem crocodiles, improve basic public infrastructure in remote coastal areas, halt the destruction of mangrove and riparian habitats, legalise the sale of crocodile products, develop a community-based crocodile monitoring programme, and strengthen community-based resource management. While some of these recommendations are outside the scope of this

management plan, the recommendations regarding crocodile removals, safety, monitoring, and legal harvest form the basis of this plan.

A link to the full Van der Ploeg et al. 2019 report can be found here:

<https://www.sprep.org/attachments/VirLib/Solomon/human-crocodile-conflict-solomon.pdf>.

Crocodile attacks have continued to occur in Solomon Islands with some of the most recent reported in October 2022. In this case two people were attacked, including a 10-year-old boy – fortunately both victims survived.



Aims and Objectives

The aim of this management plan is for long-term conservation and management of saltwater crocodiles and their habitat through sustainable use and by reducing the risk posed by saltwater crocodiles to the community.

The programme has five core objectives:

1. **Response and Removal:** to reduce the risk of attack by removing 'problem' crocodiles that pose a risk to human safety and domestic animals.
2. **Education and Awareness:** to improve community engagement and public awareness and knowledge of saltwater crocodiles.
3. **Research and Population Monitoring:** to develop an ongoing population monitoring programme (status, dynamics and distribution).
4. **Commercial harvest and export:** to assess the potential for implementing a crocodile ranching or farming program and review the national and international requirements for exporting skins.
5. **Reporting and Coordination:** to develop a reporting and coordination plan that provides the framework for establishing community-based CLOs and national crocodile management coordinators (CMC) and identify what information will be collected, in what format, and how it will be coordinated.

The programme is underpinned by the following guiding principles:

1. **Governance & Research:** Management and regulatory decisions will be evidence-based, supported by high-quality scientific data and robust monitoring.
2. **Legal instruments:** The treatment of saltwater crocodiles must be culturally appropriate, humane and in accordance with the requirements of relevant national protocols, guidelines and legislation.
3. **Stakeholder Partnership:** Collaboration and cooperation will occur between key government ministries, donor partners and other stakeholders.
4. **Cultural Heritage:** Culture, traditional ecological knowledge and symbolic representation recognised and aligned with the plan.
5. **Safety and protection of human life:** Must strongly focus on the protection of human life, protection of safety of public, women, youths, children and vulnerable community members or people with special needs who are at risk in rural or remote communities or anywhere throughout Solomon Islands (save lives and properties, while maintaining or avoiding risk).

1. Response and removal

Human-crocodile conflict ‘hot spots’

Saltwater crocodiles are widespread throughout Solomon Islands and occur in all coastal waterways, including tidal (saltwater) and non-tidal (freshwater) rivers, lakes, lagoons, wetlands, estuaries and the ocean (Van der Ploeg et al. 2019). However, based on historical reports of crocodile attacks and deaths, regular crocodile sightings, and the location of breeding and nesting habitats, certain areas were identified as ‘hot spots’ for human-crocodile conflict (Van der Ploeg et al. 2019). This plan recognises these hot spots and the greater likelihood of attack at these locations (see Appendix 3).

Problem crocodile definition

A problem crocodile is defined based on the level of risk it poses to human safety. The three main criteria to consider are size, location and behaviour – with larger (>2 m) crocodiles living close to humans and displaying aggressive behaviour posing the greatest risk to public safety. Crocodiles around 2 m and above pose a greater threat to humans and are primarily responsible for most attacks throughout the species range. Crocodiles smaller than this are rarely known to attack humans. For Solomon Islands, there are three definitions of problem crocodiles relating to size, location and behaviour:

- The crocodile has attacked or is about to attack a person.
- The crocodile is behaving aggressively towards a person.
- The size and location of the crocodile makes it a potential threat to human safety or wellbeing.

A crocodile is displaying aggressive behaviour if it approaches humans or shows no fear and does not flee in response to the presence of humans. Essentially, any crocodile that poses a threat to human safety or other animals including livestock, is considered a problem

crocodile under this Plan and will be targeted for removal, where practical.

Response to a problem crocodile

The RSIPF is responsible for public safety and is often called upon to respond to and remove problem crocodiles. However, the remoteness of many communities in Solomon Islands often limits the ability of the RSIPF to respond rapidly. In situations where a crocodile poses an immediate threat requiring rapid action, experienced local hunters, using spears and traps, are often called on to capture and destroy the crocodile (Van der Ploeg et al. 2019).

Therefore, this plan recognises RSIPF and experienced local hunters as ‘suitably qualified’ people that are best placed to respond to problem crocodiles and remove them via shooting or spearing/trapping and humane destruction. The process involved with assessing and removing a problem crocodile under this Plan is as follows:

1. **Incidence (sighting and attack):** communities or any individual witness to record or collate details/information of any potential risk or crocodile attack onsite anywhere in Solomon Islands.
2. **Report:** the sighting/incident/attack to local authorities or a suitably qualified person.
3. **Assess:** an assessment is done by a RSIPF to determine whether the crocodile meets the criteria of a problem crocodile.
4. **Alert:** the local community is notified of the location and nature of the threat and crocodile safety information is provided (see Education and Awareness section) including erection of warning signs.
5. **Respond:** If it is deemed a problem crocodile, a suitably qualified person targets the crocodile for removal humanely through shooting or trapping in line with any cultural considerations.



In some instances, an assessment might find there was no crocodile, such as mistaken identity (i.e., floating log, turtle), or that the crocodile was either only little and posed no threat (e.g. <1 m), or just moving through the area (e.g. beach zones). In these cases, the only response required is to advise the person who reported it and other concerned parties (communities, those people in the vicinity) of the reason no action was taken. See Appendix 4 for decision-making process flowchart.

Cultural considerations

Due to the strong cultural connection many groups have with crocodiles, it is important that management actions are undertaken in consultation with the local community. Many communities still revere crocodiles as ancestors and consider killing or even touching them taboo (Van der Ploeg et al. 2019). However, due to increased attacks, these restrictions have been eased in some communities, some of which are now happy for outsiders to kill problem crocodiles. In other parts, the community will hunt and destroy the animal themselves following an attack on a human, which is considered a violation of the totemic agreement (Van der Ploeg et al. 2019). Furthermore, the introduction and prevalence of Christianity has also eroded many of these cultural beliefs.

Animal welfare

Animal welfare in Solomon Islands is not addressed under any legislation or local laws. Therefore, Solomon Islands will refer to the '*Australian Code of Practice for the Humane Treatment of Wild and Farmed Crocodiles*' Code of practice for the humane treatment of wild and farmed Australian crocodiles – DCCEEW for guidance. This Code of Practice

was developed by leading crocodylian experts and provides the minimum standards required to achieve the safe and humane capture, handling and transportation of crocodiles in the wild and captivity. All activities relating to the take, keep and use of crocodiles in Solomon Islands should be guided by this Code where it doesn't infringe upon traditional rights.

Response and removal plan and alternative management options

The vast and remote nature of Solomon Islands, combined with limited funding and resources, means that crocodile management in the country is challenging. Therefore, a review of the current management response and an assessment of alternative options in terms of improved public safety and cost-effectiveness should be considered as part of this plan. Two potential options recommended by Van der Ploeg et al. (2019) include:

- (1) Establishing a team of experienced crocodile hunters who travel around the country to trap and remove problem crocodiles.
- (2) Concentrate RSIPF crocodile response and removal efforts in the main urban and tourism areas of the country (Honiara, Auki, Tulaghi, Taro, Buala, Gizo, Munda and Seghe) (Van der Ploeg et al. 2019).

Based on this assessment a more detailed Response and Removal Plan can be developed that considers the logistical, animal ethics and cultural complexities across the country. This should also emphasise on developing Animal Welfare Act or Ethics for Solomon Islands.

2. Public education and awareness

Education and awareness

Public education and awareness are critical components of any effective crocodile management programme. The community and visitors need to be provided with clear advice on how to minimise the risk of attack when living near crocodiles or entering crocodile habitat. In places such as Australia, crocodile education programmes such as ‘Be Crocwise’ have been very effective in reducing human-crocodile conflict (Fukuda et al. 2014, Brien et al. 2017). Given the strong cultural connection between humans and crocodiles in Solomon Islands, it is important to consider and integrate traditional ecological knowledge and cultural values into education and awareness – so that people can be ‘SI Crocwise’.

Risk of crocodile attack

Saltwater crocodiles can pose serious risk to human safety, livestock, pets, and can adversely affect people’s livelihoods (Fukuda et al. 2014, Webb et al. 2021). Attacks are increasing (Figure 9) and can result in serious injury and death, with children at higher risk due to their smaller size. People are at greater risk of attack when they are:

- In the water (e.g. swimming, wading) or near the water’s edge.
- Near the mouth of a creek or river.
- In the company of dogs or livestock.
- Active in/near water between dusk and dawn.

It is also important to remember that:

- Crocodiles are cryptic, ambush predators, that can remain underwater for several hours on a single breath and will respond to any movement at or near the water’s surface. Therefore, just because you cannot see a crocodile, does not mean there is not one present.


- Crocodiles are more active during the warmer, wetter months of the year (November–April), which also coincides with breeding season, and females will often actively defend their nest and young.
- Most wild crocodiles are typically wary of humans but will become bolder and more aggressive if they are fed by people directly or indirectly (e.g. fish/meat scraps left near human habitation).
- While the removal of crocodiles in an area may reduce the chance of attack, it does not eliminate the risk, as crocodiles can rapidly move between river systems and replace those that have been removed.

Be SI Crocwise

To reduce the chances of a crocodile attack, it is important that people take responsibility for the safety of themselves, their family and the community. The risk of crocodile attack can be significantly reduced by following a set of simple SI Crocwise behaviours and encouraging others to do the same. Van der Ploeg et al. (2019) noted that communities were already taking preventative measures to reduce the chance of crocodile attack, including supervising children near the water, avoiding fishing alone, being alert at night and during floods, and constructing holding pens for livestock such as pigs. The SI Crocwise behaviours (Figure 9) build upon these.



BE SI CROCWISE



Report any crocodiles you are concerned about as soon as possible to a local suitably qualified person - RSIPF, local hunters.

Pay attention to any warning signs and seek local advice about crocodile safety in the area from authorities - RSIPF.

Stay at least 5 metres back from the water's edge or place a barrier between you and the water.

Do not feed crocodiles or dispose of food and fish scraps in or near the water.

Avoid entering the water between dusk and dawn when crocodiles are most active.

Avoid taking dogs and livestock down close to the water. Keep livestock penned.

Look for signs of a crocodile before entering the water (e.g. slides, prints, basking spots).

Avoid crocodile nests and groups of hatchling crocodiles in the water as female crocodiles will often actively defend them.



Avoid getting in the water at the mouth of creeks and rivers.

Avoid wading in flood waters close to waterways.

Avoid defaecating in the mangroves and in waterways.

Wash clothes in clear, shallow, fast-flowing sections of the river.



Figure 9. SI Crocwise Behaviours

National Crocwise Education and Awareness Plan

Another goal of this management programme is to develop a clear, achievable and coordinated National Crocwise Education and Awareness Plan that outlines the government's approach to education and awareness. This would consist of outlining clear and simple messages around the risks of crocodiles and recommended SI Crocwise behaviours (Figure 10), providing local contact details for reporting crocodiles and emergencies,

explaining legal rights and responsibilities of individuals as they relate to crocodiles, development of education materials (e.g. brochures, pamphlets, signs), and how and when information will be disseminated to the community (e.g. local radio, public events, media platforms such as Twitter, Facebook). An example of a SI Crocwise educational product can be seen in Appendix 6.



Figure 10. An adult crocodile basking at Wairaha riverbank, West Areare region, Malaita Province. © T. Maeda/ECD/MECDM



3. Population monitoring

Population monitoring in Solomon Islands

The saltwater crocodile population is estimated at 1,400 – 2,300 non-hatchling crocodiles, up from an estimated 720 crocodiles in 1989 (Messel and King 1990, Van der Ploeg et al. 2019). Population monitoring of saltwater crocodiles includes either the use of a spotlight out of a boat at night, or the use of a helicopter using standardised approaches (Fukuda et al. 2013). However, the only spotlight surveys to be conducted in Solomon Islands occurred in 1989 (Messel and King 1990). While a total of 52 locations were surveyed, standardised surveys were largely considered impractical in Solomon Islands due to the small, shallow, densely vegetated river systems and remoteness of many of the islands (Messel and King 1990, Van der Ploeg et al. 2019). Consequently, alternate approaches had to be considered.

Therefore, between 2016 and 2018, WorldFish along with MECDM and MFMR completed a nationwide process of formally interviewing community members throughout Solomon Islands about their knowledge of the crocodile population, cultural relationship and values, and extent of human-crocodile conflict. It was found that local fishermen and community members had intimate knowledge of the crocodiles in their local area, including basking and nest sites, and daily and seasonal movements. They could also identify hotspots for human-crocodile conflict and provide information on crocodile sightings, human-crocodile incidents, and changes over time. This proved to be a cost-effective

approach that provided valid information on the population size, distribution, abundance and changes over time, along with the nature and extent of human-crocodile conflict in Solomon Islands.

Ongoing monitoring of the crocodile population and extent of human-crocodile conflict, through a structured and coordinated programme, will allow objective assessment of trends over time. These are key performance indicators of whether the management programme is meeting its goals or needs to be adapted. This information is required as part of any proposal to CITES to transfer the recovered Solomon Islands population of saltwater crocodiles from Appendix I to Appendix II, to allow the commercial export of specimens as required.

Population monitoring plan

A goal of this management plan is to develop a Population Monitoring Plan replicating the interview style approach of Van der Ploeg et al. (2019). Consideration should also be given to doing this in conjunction with surveys on a small number of the larger, more accessible river systems on major islands, where interest and capacity at a local community level exist to undertake them. As crocodilians are long-lived species and surveying crocodiles is resource intensive, surveys would not need to be done annually. While it is possible for other ecological or behavioural research to be undertaken on crocodiles in Solomon Islands, the focus should be primarily on population monitoring as it will directly inform management and conservation.

4. Sustainable commercial harvest and export

Historical harvest

Internationally, saltwater crocodile skins, meat, and parts (e.g. head, teeth) are commercially valuable, however it is the skins, used to produce high fashion handbags, that provide the highest economic returns (Webb et al. 2021). Historically, the commercial trade and export of crocodile skins from Solomon Islands was mainly to Japan. Skins came from direct wild harvest and, although the extent of trade was low (100–200 per year), it was an important source of revenue for rural communities in the 1970s and 1980s (Richards et al. 1994). However, during this time, crocodile hunting intensified dramatically, as locals hunted crocodiles to ensure people's safety and to sell the skins for economic return. This led to a dramatic decline in the crocodile population (Messel and King 1990). Since the cessation of commercial hunting in 1993 the population has rapidly recovered and is estimated at between 1,400 and 2,300 non-hatchlings (Van der Ploeg 2019). Solomon Islands intends to move toward a model of sustainable commercial harvest and export that would provide economic incentives for people to tolerate an increasing crocodile population. This section of the Plan sets out the steps required to move towards this goal.

Current legislative restrictions on commercial harvest

The saltwater crocodile (*Crocodylus porosus*) population in Solomon Islands is listed under Appendix I of CITES, and Schedule I, Section 11 of the *Wildlife Protection and Management Act 1998*, which prohibits export of crocodile products. Part III section 11(1) prohibits a person to export or attempt to export any animal or plants in Schedule I, unless they are

an approved person and have a valid export permit issued for scientific research under section 14(5). However, the legislation has always allowed for the use of crocodiles for traditional or cultural purposes such as for food, ritual, or when a crocodile poses a risk to human safety, so long as the activity does not negatively impact the population. Other national legislation relevant to crocodiles can be seen in Appendix 1.

Viability review of a commercial harvest

Given the relatively small wild population size within Solomon Islands, options for potential commercialisation will be carefully considered. The Van der Ploeg et al. (2019) report recommended legalising the sale and export of crocodile products. However, it also recommended that a smaller scale artisanal approach, based on the sale of heads, teeth and skins as souvenirs for tourists, may directly benefit rural communities and be cost-effective to operate. The report cautioned against implementing larger ranching/farming schemes like those in Australia and Papua New Guinea supplying skins for the high-end fashion industry, without due diligence. There are challenges for a remote island nation to engage in such an industry where the infrastructure and technology needed is evolving rapidly, the international market is volatile and competitive, there is no ready food supply (meats), and the strengths and weaknesses of local saltwater crocodile skins have not been assessed.

Community-based programmes where small numbers of juvenile crocodiles could be collected and raised (ranching), in small



backyard enclosures, until they reach harvest size, may be possible. They could be processed on-site, the meat used locally, with salted skins, heads and teeth sent to market. Such rural enterprises for meat and skins have occurred historically (Van der Ploeg et al. 2019) and could provide a cost-effective option.

Review of Appendix II requirements and CITES proposal

Before any products from wild crocodiles can be exported from Solomon Islands, including skulls, teeth or other handicrafts from problem animals, a proposal will need to be made to CITES to transfer the Solomon Island population of *Crocodylus porosus* from Appendix I to Appendix II, based on the population recovery that has taken place. The information assembled for this proposal will assist in assessing future management options involving sustainable use.

Solomon Islands must demonstrate that its wild population of *C. porosus* no longer meets the criteria for Appendix I [Annex 1 of Resolution Conf. 9.24 (Rev. CoP17)] but does meet the criteria for Appendix II [Annex 2 of Resolution Conf. 9.24 (Rev. CoP17)] and that the precautionary measures [Annex 4 of Resolution Conf. 9.24 (Rev. CoP17)] can be satisfied. The proposal needs a supporting statement [Annex 6 of Resolution Conf. 9.24

(Rev. CoP17)] that demonstrates unequivocally, with historical and current survey data, that the wild population has recovered, that human-crocodile conflict is increasing, and that the ability to trade will provide a mechanism to incentivise ongoing conservation based on sustainable use. Proposals are considered at meetings of the Conference of the Parties, which occur every two to three years, and need to be submitted 150 days before those meetings.

An immediate priority is to assess the specific information requirements for a proposal [Annex 6 of Resolution Conf. 9.24 (Rev. CoP17)], determine which can be answered with historical and current data and knowledge, identify any significant gaps, and if they exist, develop an action plan to address them. Once all relevant information has been obtained, the proposal to CITES can be prepared and submitted.

Permitting and compliance

The national procedures for permitting, assessment, regulatory compliance and reporting, will be reviewed to ensure when an Appendix II listing is obtained, that Solomon Islands meets all statutory obligations, and that the national system integrates with the CITES Export and Import requirements (CITES Article VI *Permits and Certificates*). A draft of a proposed regulatory system is in Appendix 1.

5. Reporting and coordination

To establish the nature and extent of human-crocodile conflict, and how this may change over time with and without management interventions, it is important that details of each problem crocodile incident (sighting, near miss, attack) are recorded locally and reported to the responsible Ministry for centralised coordination. Basic data required should include: date, time, location, habitat type, size of crocodile, nature of incident, victim, and the management response. A basic crocodile attack/incident report template can be found in Appendix 5.

Where possible, consideration should be given to appointing a local point of contact in each community ('Crocodile Liaison Officer' – CLO) who can report and advise on crocodile related matters. This would preferably be a local RSIPF or other government officer but could also be a representative of the community. This role would be responsible for completing crocodile incident reports, undertaking crocodile population monitoring and education, and providing reports on these activities to the relevant Ministry on a quarterly basis or as required.

A Ministry representative should also be appointed to coordinate crocodile management activities ('Crocodile Management Coordinator' – CMC). This role would essentially involve working with communities and other stakeholders to ensure consistent and regular reporting of crocodile incidents, education and awareness work, entry of crocodile incident and monitoring

data into a centralised data base, and the production of an annual national report, which can be disseminated back to the communities and relevant stakeholders.

Reporting and coordination plan

The reporting and centralised coordination of all crocodile management activities is considered crucial to the success of the management programme. As such a Reporting and Coordination Plan should be developed that provides the framework for establishing community-based CLOs, what information will be collected and in what format, and how it will be coordinated. An important first step would be to determine the viability of such a scheme by assessing what capacity and interest exists in the community.



6. Training and capacity building

It is important to further enhance the skills, knowledge and capacity of enforcement, management, education and scientific authorities, including RSIPF, MECDM, MFMR as well as designated CLOs, to better identify, communicate and implement control and response measures regarding problem crocodiles, disseminate crocodile safety information, and undertake population monitoring. This will require the design and implementation of a training programme that will have both theoretical and practical

components. It should be simple and provide basic training to those involved in the safe capture, handling and transportation, and destruction of crocodiles (e.g. RSIPF, local hunters), as well as those involved in education, data collection, reporting and coordination of management activities (e.g. CLO, CMO). Training, capacity building and awareness should also include Commercial Trade and Management programmes that reflect Solomon Islands local context, with consideration of remoteness and fragmentation of the islands.

7. Review of the management plan

A review of this management plan should be done every five years, or sooner if required, and focus on progress against the objectives. It should also consider any legislative or administrative changes that may affect the plan. The 2022 management programme will be reviewed by government ministries and its relevant stakeholders in accordance with legal obligations and mandates under the *Environment Act 1998*, *Protected Areas Act 2010*, *Fisheries Management Act 2015*,

Wildlife Protection and Management Act (Amended) 2017, and associated provincial Acts and regulations. It is proposed that the management plan will be amended should there be changes to management actions, legislation, and administrative arrangements during the life of the plan unless any such changes are so significant that the Solomon Islands Government determines that a new programme is required.

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Appendices

Appendix 1: National legislative framework

Wildlife Protection and Management Act 1998 & Wildlife Protection and Management Regulation 2008

The *Wildlife Protection and Management Act 1998* provides the regulatory framework for the protection, conservation and management of wildlife in the Solomon Islands. It governs the export and import of prescribed animals and plants and outlines the obligation imposed upon Solomon Islands under the Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora and for other matters connected or incidental thereto.

Some of the objectives of the Act as per Section 3. The object of this Act is to comply with obligations of Solomon Islands under CITES or otherwise to further the protection and conservation of the wild flora and fauna of Solomon Islands by regulating –

- (a) the export of specimens that are, or derived from, native Solomon Islands animals or native Solomon Islands plants;
- (b) the export and import of specimens that are, or are derived from animals, or plants of a kind that are threatened with extinction;
- (c) the export and import of specimens that are, or are derived from, animals, or plants, of a kind that require, or may require, special protection by regulation of international trade in such specimens;
- (d) the import of animal specimen or plants specimen which could have an adverse effect on the habitats of native Solomon Islands animals or native Solomon Islands plants; and
- (e) the management of flora and fauna to ensure sustainable uses of these resources for the benefit of Solomon Islands

Wildlife Protection and Management (amendment) Act 2017 and Wildlife Protection and Management (amendment) Regulation 2019

In 2017, the Solomon Islands government through the Ministry of Environment Climate Change Disaster Management and Meteorology passed the *WPM (Amendment) Act 2017* as the act intended to focus on CITES, which regulates the International Wildlife Trade for Solomon Islands. For *WPM (Amendment) Act 2017*, Part I-V are amended and insertion of Part 2 (new part) Regulation of Trade in CITES specimen, has Division 1-3. *The WPM (Amendment) Regulation 2019* amends the *Wildlife Protection and Management Regulations 2008* (the “Principal Regulation”). Schedule 1 amended; replaced with new table of fees. Also, insertion of (new part) Part 5, Powers and Functions of CITES Authorities including new Forms 17-20.

Pursuant to section 3E subdivision 1 of division 3 of the WPM (amendment) Act 2017

- (a) A person commits an offence if the person trades in a CITES specimen in contravention of this Division.

Maximum penalty: 50,000 penalty units or 5 years imprisonment, or both.

Environment Act 1998 & Environment Regulation 2008

The *Environment Act* 1998 establishes the Environment and Conservation Division (ECD) as a CITES Management Authority responsible for crocodile management. It makes provisions for the overall protection and management of the Solomon Islands environment. The purposes of the Act include the establishment of the Environment Advisory Committee which independently advises the Ministry¹ on relevant environment issues and matters.

The four objectives of the Act are:

- i. To provide for and establish integrated systems of development control, environmental impact assessment and pollution control.
- ii. To prevent, control and monitor pollution.
- iii. To reduce risks to human health and prevent the degradation of the environment by all practical means.
- iv. To comply with and give effect to regional and international conventions and obligations relating to the environment.

The Act also addresses the application of environmental impact assessment (EIA) which takes into consideration components of developments that are likely to affect the environment. The Act requires that an EIA be carried out in the project planning stage prior to implementation. As a planning and management tool, EIA is very important for decision making processes.

Protected Areas Act 2010

The *Protected Areas Act* 2010 is developed with the objective of establishing protected areas to conserve biological diversity. To achieve these, the Act provides for the establishment of a Protected Areas Advisory Committee (PAAC) and made provisions for declaration of protected areas by the MECDM from the advice of the Director of ECD. To finance biodiversity protection, the Act established a protected area trust fund to be managed by the PAAC.

The *PA Act* 2010 objectives are:

- i. Establish a system of protected areas where special measures need to be taken to conserve biological diversity.
- ii. Develop guidelines for selection, establishment, and management of protected areas.
- iii. Regulate and manage biological resources important for the conservation of biological diversity within or outside protected areas.
- iv. Promote the protection of ecosystems, natural habitats, and maintenance of viable populations of species in natural surroundings.
- v. Promote environmentally sound and sustainable development in areas adjacent to protected areas and rehabilitate and restore degraded ecosystems.

The *PA Act* 2010 has, to date, established five national sites in the Solomon Islands, some of which have reported the occurrence of saltwater crocodiles e.g. Arnavon Community Marine Park (ACMP).

Fisheries Management Act 2015 - Prohibited Activities

Fisheries management Act 2015 gives power to the Minister to make provisions for the conservation, management, development and sustainable use of fisheries and marine resources of Solomon Islands, and to monitor and control fishing vessels within and beyond the fisheries waters, for the benefit of the people of Solomon Islands. This includes developing regulations for managing fishing, aquaculture, and other related activities. Fisheries Management (Prohibited Activities) Regulation 2018 has placed a national moratorium on the export of crocodile. The regulation prohibits export of crocodile or its parts.

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- The key objective of the *FMA 2015* is to ensure the long-term management, conservation, development and sustainable use of Solomon Islands fisheries and marine ecosystems for the benefit of the people of Solomon Islands.

Provincial Government Act 1997

The *Provincial Government Act 1997* (PG Act 1997) schedule 3² provides activities for which respective provinces have responsibility and power to create and pass ordinances; trade and industry, culture and environment matters, Agriculture and Fishing; Land and Land Use, and local matters; Rivers and water.

Provincial legislative authority derives from a combination of the *PGA 1997* and the accompanying devolutions orders (PGA s33). The expansion of Solomon Island Government legislative arms down to its nine provinces is through the Cabinet's recognition of the broader need to accommodate the broader provincial, national and international obligations and mandates.

The procedure of enacting provincial ordinances is like other Acts for other subject matter over which a province has devolved power.

Provincial laws or ordinances (relating to Wildlife Protection & Conservation)

The objectives or nature of the provincial ordinances are critical for its implementation, where the outputs should reflect the Solomon Islands CITES obligations, including other conventions. (McDonald, 2006)³ in-depth analysis on relevant national laws and provincial ordinances which regulates the use of marine resource relating to management and conservation in Solomon Islands, identifies key gaps and recommendations of existing laws.

At least seven Provincial Governments have formulated ordinances which focus on environment, wildlife protection, conservation and natural resource management and preservation of culture (Table 1).

This demonstrates that most provinces already have laws that support and lend legal authority to community resource management arrangements or environmental governance. They introduce legislation towards resource management and measures to protect particular species and habitats. At the same time, advocacy for decision-making and enforcement and recognising power with traditional resources is maintained.

Despite the establishment of provincial ordinances, it is important to note, that the common gap in these ordinances is that some of their provisions are outdated, and although comprehensive, neither implemented due to limited funding and capacity. Overall, public and government awareness of the laws are extremely low.

Furthermore, for effective implementation of the Solomon Islands crocodile management plan, the remaining provinces should at least provide an ordinance relating to conservation or wildlife protection, to ensure these legislative arrangements at provincial level accommodate the national laws, and to comply with CITES obligations.

² Provincial Government Act 1997, is the Solomon Islands Government Provincial Government Act which gives power to the executive to create and pass ordinances. The Ministry of Provincial Government and Institutional Strengthening (MPGIS) is responsible for its mandates.

³ Jan McDonald, 2006. *Marine Resource Management & Conservation in Solomon Islands: Roles, Responsibilities & Opportunities*. Griffith Law School, Griffith University Queensland, Australia

Table 1: Summaries of Provincial ordinances for Solomon Islands

PROVINCES	ORDINANCES OR PROVINCIAL ORDINANCES/BY LAWS
Central Province	no ordinance relating to conservation or resource management or wildlife protection.
Choiseul Province	Choiseul Province Resource Management Ordinance 1997 (CPRMO)
Guadalcanal Province	Guadalcanal Province Wildlife Management Area Ordinance 1990 (GPWMAO)
Isabel Province	Isabel Province Marine and Freshwater Areas Ordinance 1993 (IPMFAO); Isabel Province Conservation Areas Ordinance 1993 (IPCAO); Isabel Province Wildlife Sanctuary Ordinance 1995 (IPWSO)
Makira Province	Makira Province Preservation of Culture and Wildlife Ordinance 1984 (MPPCWO)
Malaita Province	Malaita Province Wildlife Management and Licensing Ordinance 1995 (MPWMLO)
Rennell & Bellona Province	no ordinance relating to conservation or resource management or wildlife protection.
Temotu Province	Temotu Province Environmental Protection Ordinance 1994 (TPEPO)
Western Province	Western Province Resource Management Ordinance 1994 (WPRMO); Western Province Simbo Megapode Management Area Ordinance 1990; Western Province Coastal and Lagoon Shipping Ordinance 1991.



Appendix 2. Governance – responsible authority

There are agencies with mandates that interact with crocodile in Solomon Islands. This includes government agencies at the national, provincial and community level.

Ministry of Fisheries and Marine Resources (MFMR)

The Ministry of Fisheries and Marine Resources is mandated to ensure the long-term management, conservation, development and sustainable use of Solomon Islands fisheries and marine ecosystems for the benefit of the people of Solomon Islands. It is the scientific authority that provides scientific monitoring and advice for sustainable management of crocodiles and CITES listed aquatic species. Some of its roles regarding export of CITES listed aquatic animal includes:

- a. Issue license for export and commercial farming of marine commodities.
- b. Carrying out facility inspection and consignment inspection.
- c. Collaborate with MECDM to conduct crocodile assessments including Non-Detrimental Surveys.
- d. Collaborate with MECDM to develop Non-Detrimental Findings (NDF) guideline.
- e. Create regulations for management of aquatic flora and fauna.
- f. MFMR is the CITES Scientific Authority and provide science advice to the MECDM.

Ministry of Environment Climate Change Meteorology and Disaster Risk Management (MECDM)

The Ministry of Environment is responsible for sustainable environmental management, climate change adaptation and mitigation, disaster risk management and meteorological services for the Solomon Islands. The Ministry is the management authority which facilitates CITES permits for export and reporting to the CITES Secretariat. Responsibilities include the following:

- a. Provide reports to CITES on the progress and development of the enlisted products - including the saltwater crocodile.
- b. Approves and issues CITES export permits.
- c. Create legislation governing export of CITES listed aquatic animals.

Provincial Governments

Provincial Governments are mandated to govern their resources and environment through Provincial Ordinances. Responsibilities include:

- a. Creation of provincial ordinances to manage resources.
- b. Issue of provincial business licenses to companies operating in the province.

Royal Solomon Islands Police Force

The Royal Solomon Islands Police Force (RSIPF⁴) is the Solomon Islands national policing agency. The RSIPF takes the leading role in law enforcement and national security while acting in partnership with other SIG ministries and non-government stakeholders. The RSIPF will always strive to keep Solomon Islands and its people safe both locally and nationally. The RSIPF'S Vision – 'An efficient, capable and responsive policing service' – reflects its unique statutory role as detailed in the Police Act 2013. The mandate of the RSIPF is to provide a safe, secure and peaceful Solomon Islands. RSIPF roles are reflected through their robust community engagement with wide stakeholders and the public. The RSIPF is responsible for minimising the risk of crocodile attack by responding to sightings and removing problem crocodiles including those involved in an attack.

⁴ RSIPF is one of two main agencies operating under the Ministry of Police National Security and Correctional Service; RSIPF and CSSI dispose their functions as an organisational unit for change and promoting law and order to society expectations and continue to ensure the safety and security of Solomon Islands.

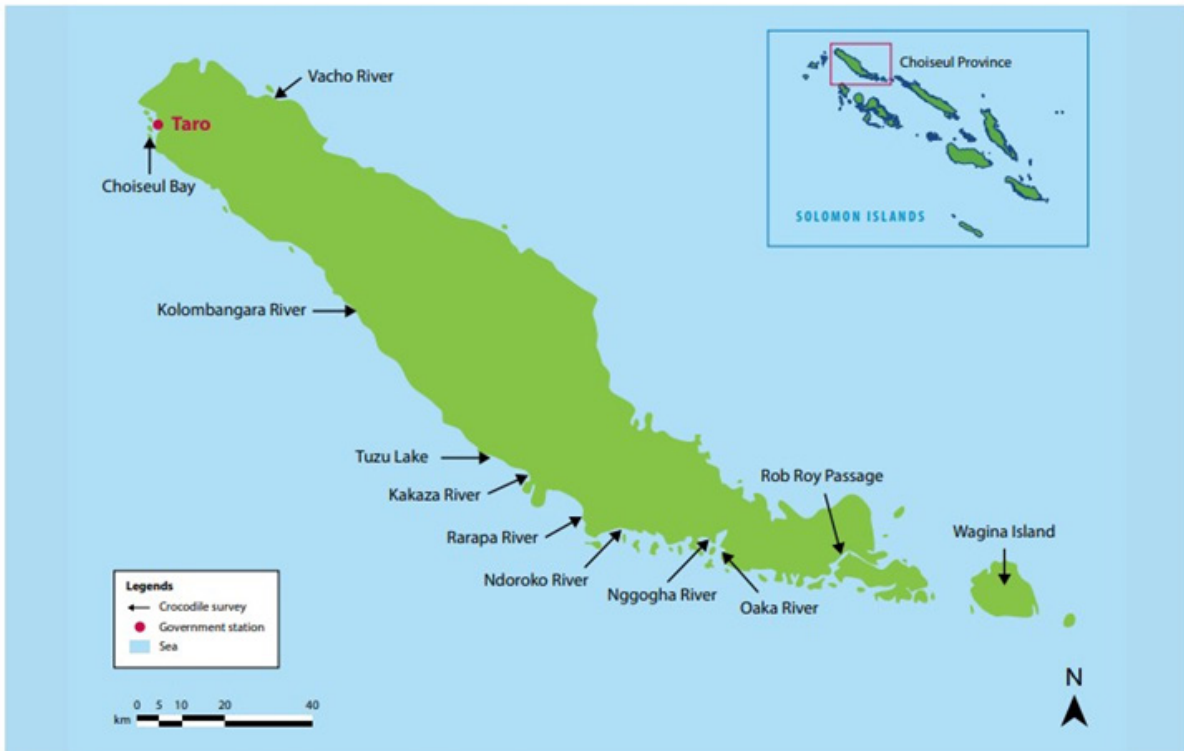
Communities (traditional Chiefs and Leaders)

Community people play a significant role as resource owners and users. They have the right to be safe from natural predators such as crocodiles but are also responsible for ensuring that the harvest of natural resources is sustainable. Use of traditional knowledge in management is an important way community people can contribute to sustainable resource management. Communities also play a crucial role in communication and sharing of information/data with relevant agencies on ecology, history, biology of crocodiles, as well as records and reports of crocodile sightings and attacks.

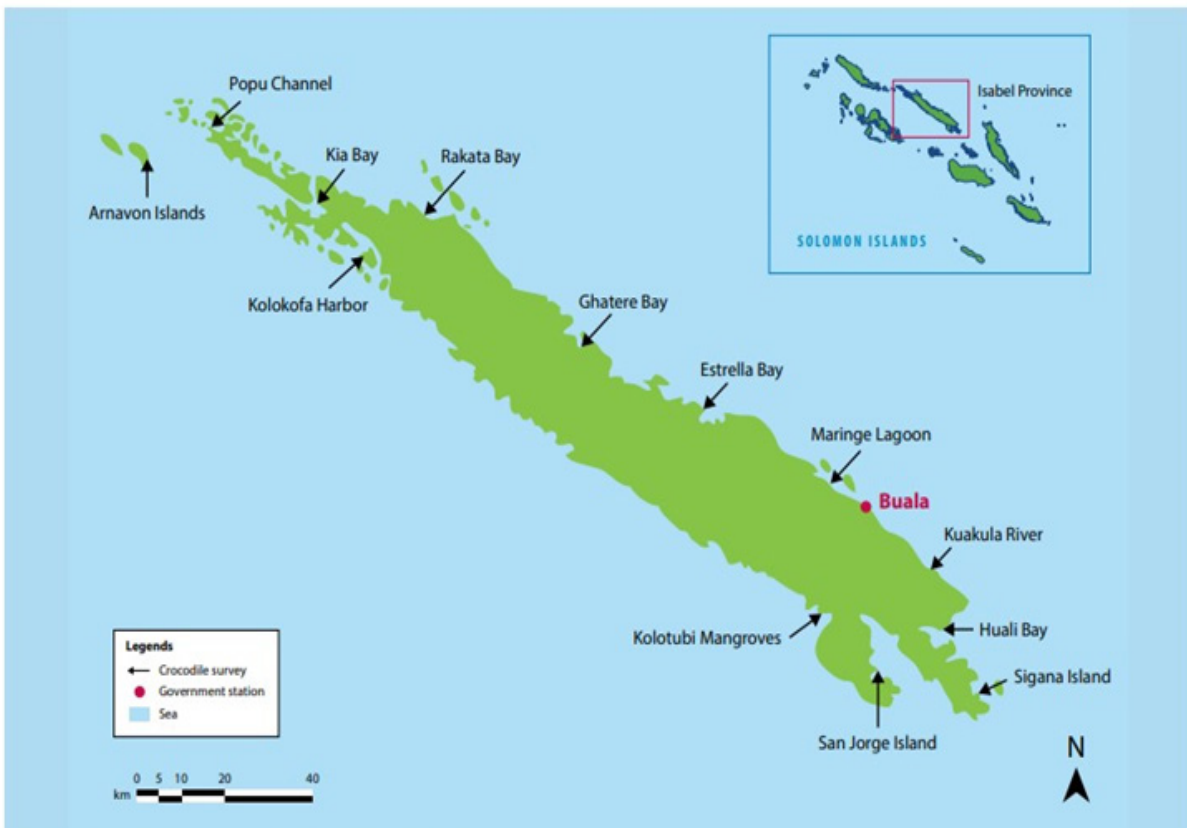
Communities or tribal groups comprise of chiefs or tribal leaders, or representative house of chiefs who are responsible for overall decision-making or arrangements within their respective villages or tribes. This management plan recognises their local governance or leadership arrangements to address any threat or risk regarding safety of the people, including, women, children, youths, both existing genders, and vulnerable groups, including people with special needs (MWYCFA).



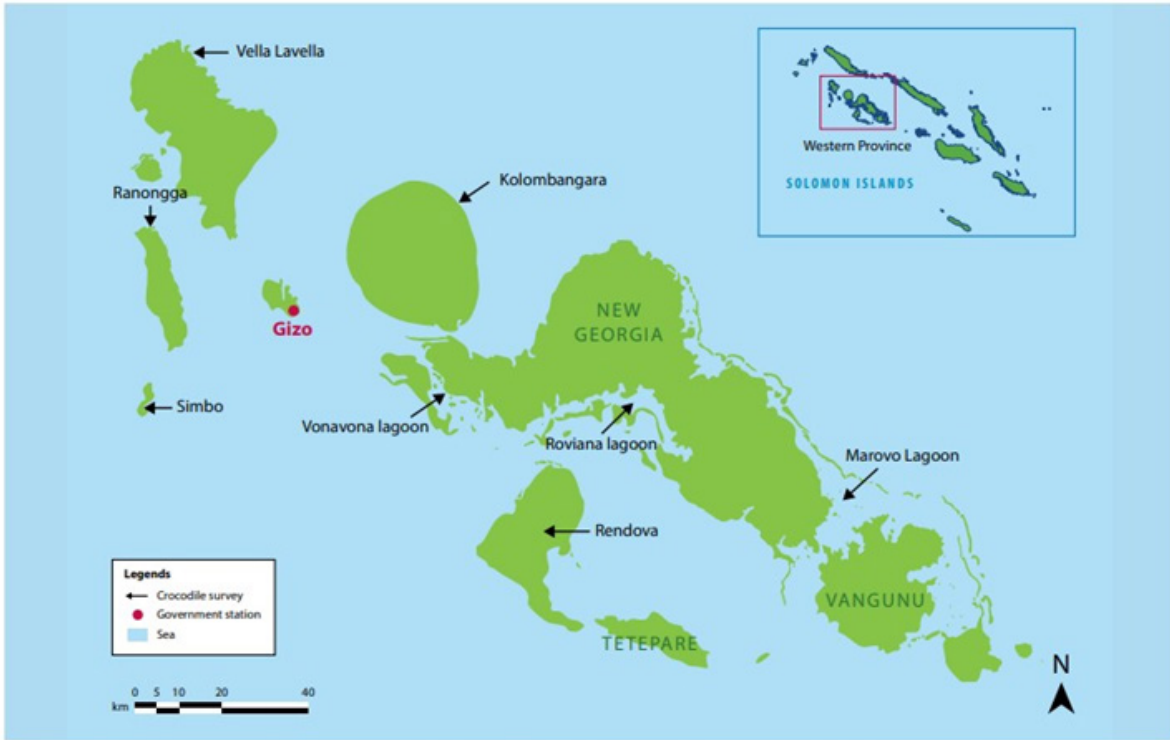
Appendix 3. Human-crocodile hotspots in Solomon Islands



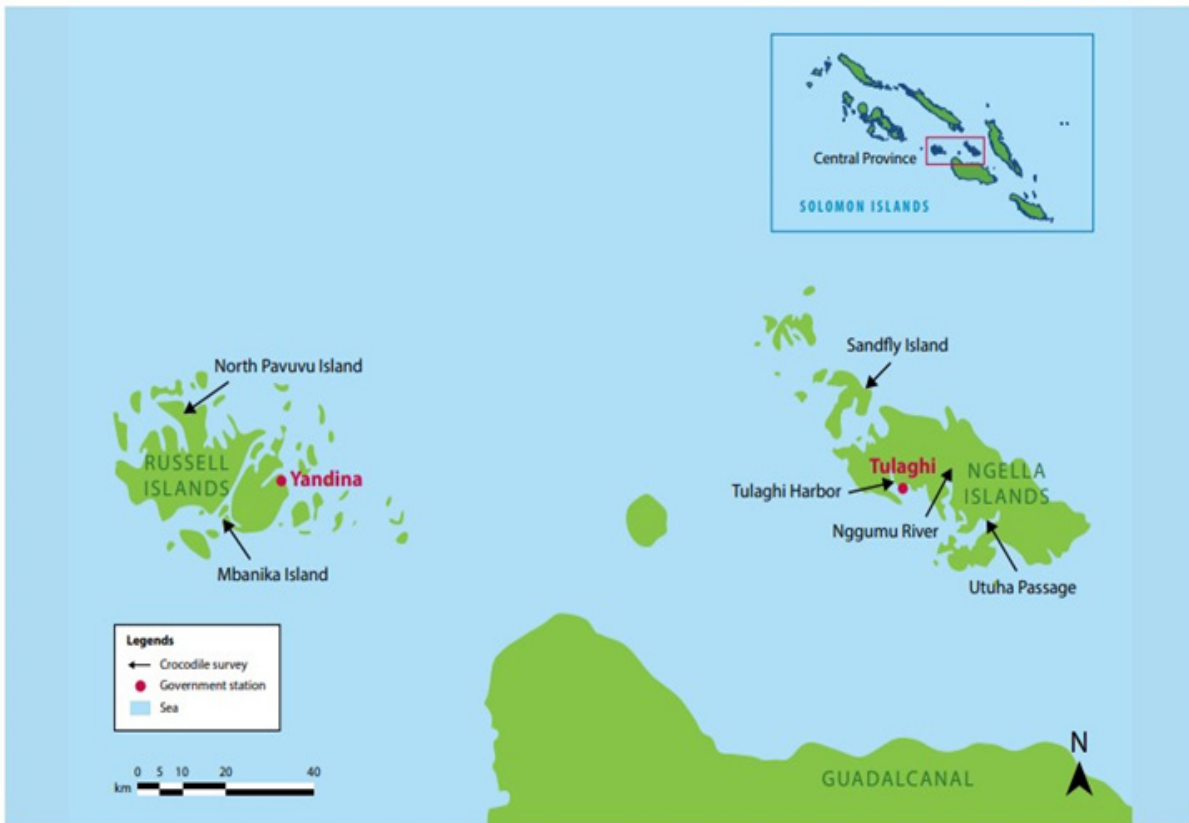
Map 1. Saltwater crocodile hotspots in Choiseul.



Map 2. Saltwater crocodile hotspots in Isabel.

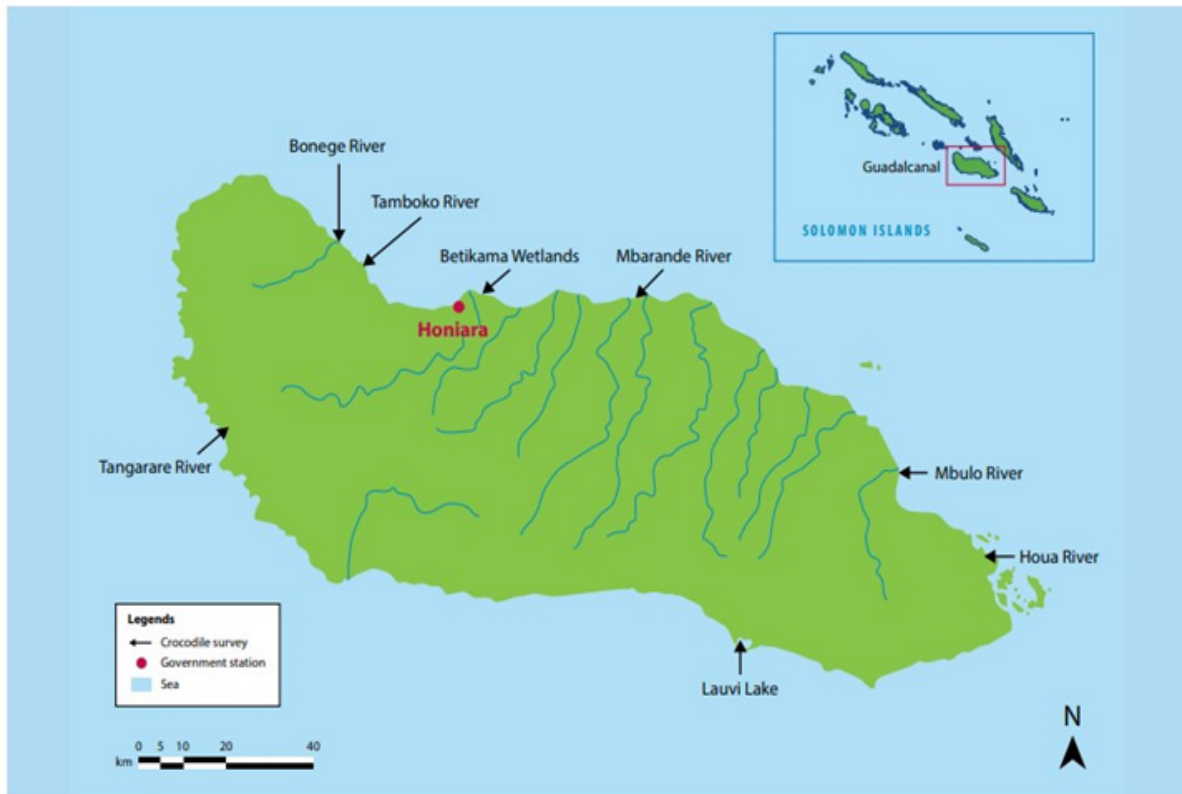


Map 3. Saltwater crocodile hotspots in Western Province.

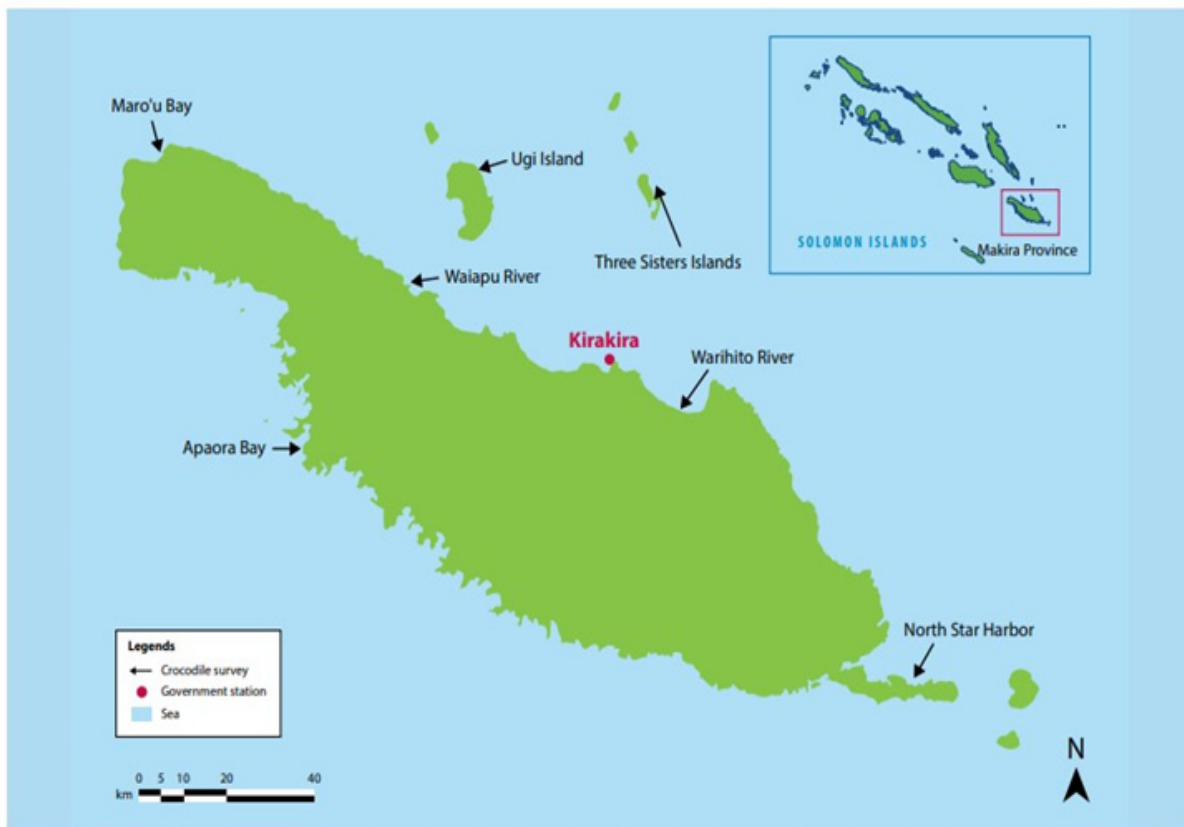


Map 4. Saltwater crocodile hotspots in Central Province.

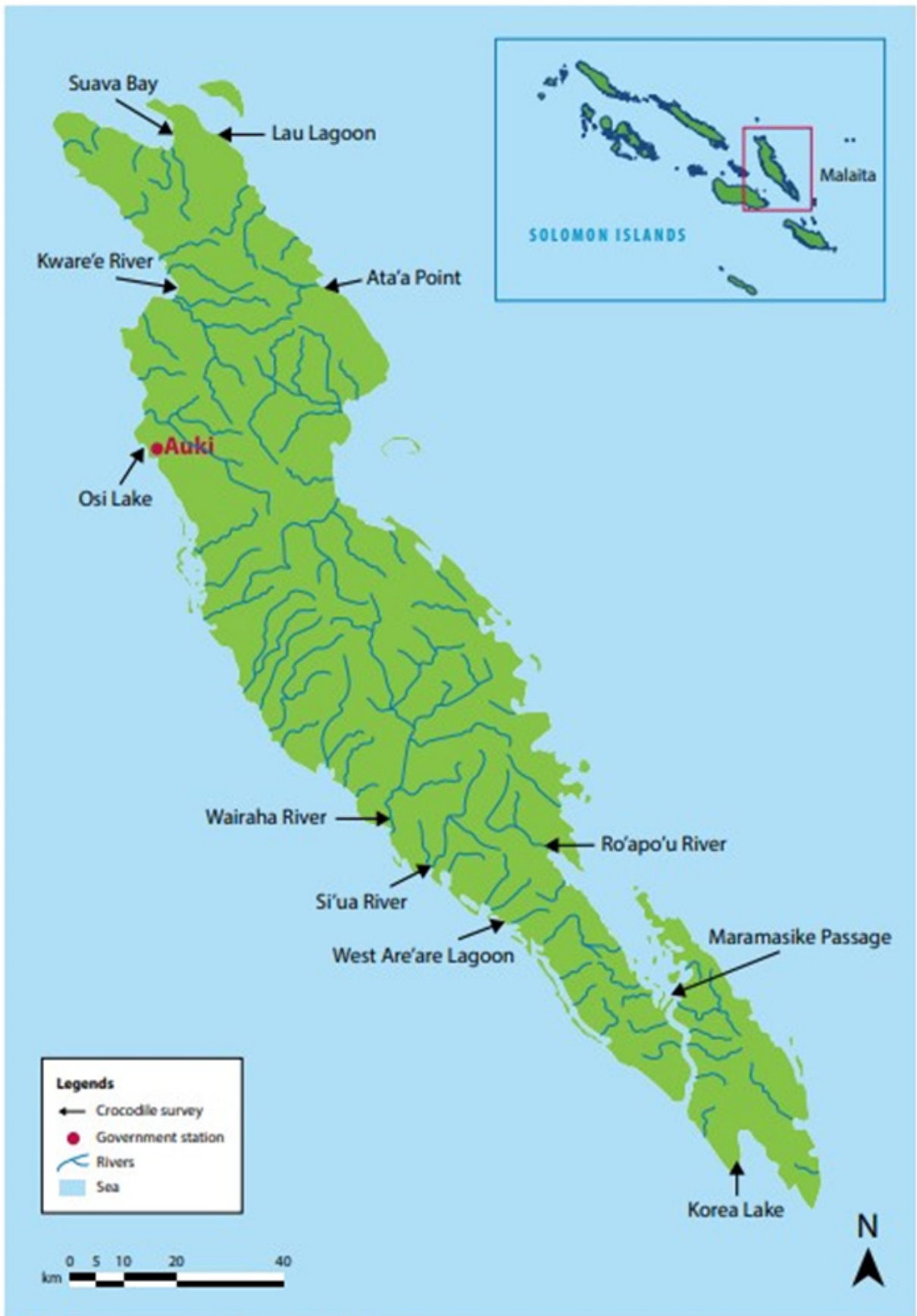




Map 5. Saltwater crocodile hotspots in Guadalcanal.



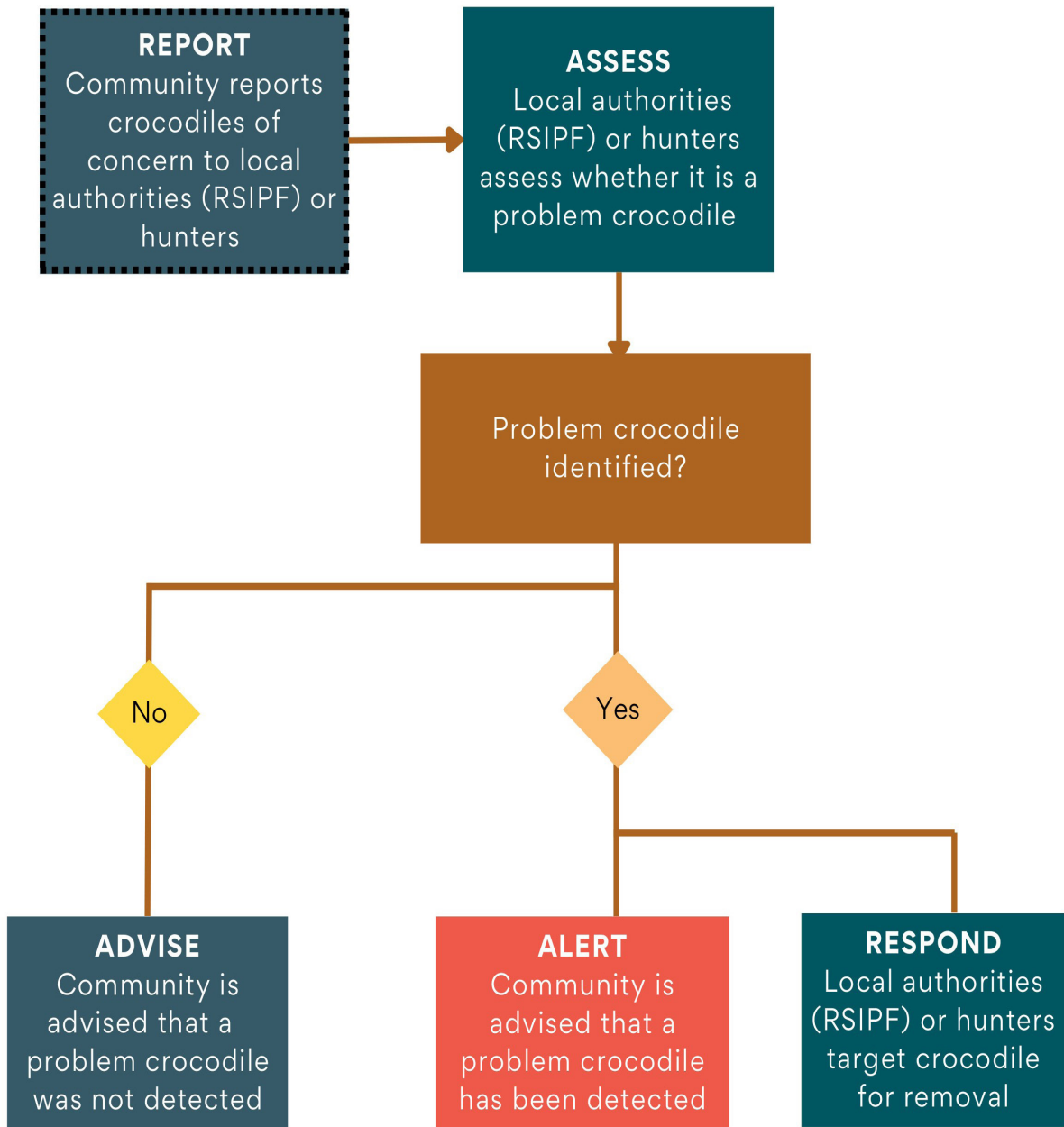
Map 6. Saltwater crocodile hotspots in Makira.



Map 7. Saltwater crocodile hotspots in Malaita.



Problem crocodile decision making procedure



Appendix 5. Problem crocodile incident report template

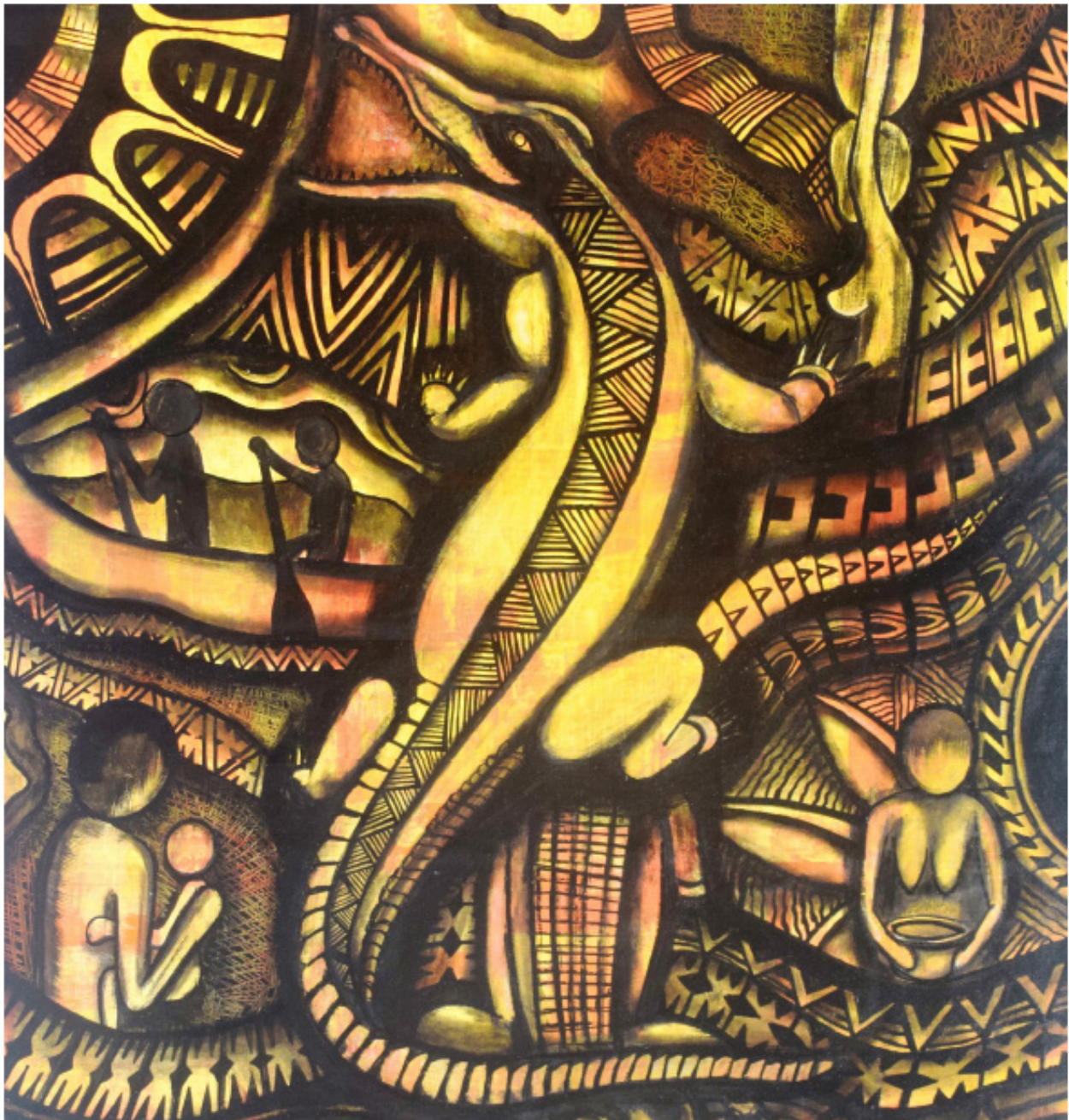
Attacks on humans

Date of the attack:		Time of the attack:	
Size of the crocodile (cm):			
Name of the location:	Village:	Ward:	Province:
Description of location:			
Outcome:	Fatal (1)	Non-fatal (2)	Unknown (3)
Name of the victim:	Age:	Sex: Male	Female
Activity (what was the victim doing at the moment of the attack)			
Eye-witness	Yes	No	Name:
Details of the incident			
Reason for the attack			
Quality of the report:	Reliable (1)	Unknown (2)	Unreliable (3)

Template for recording data on crocodile attacks or incidents (source Van der Ploeg et al. 2019).



Appendix 6. Solomon Islands Crocwise messaging design



Keakea lo krokodael

- No go inwet lo wata plus oiketa krokodael save stap
- Ma luklak gud taem na go fuing lo naet
- Respektin oiketa kastom aniwale an oiketa tambu plus
- Reportin oiketa problem krokodael lo polis
- Lukaotim piintini taem oiketa plus lo wata
- No go selava inwet lo riva or st
- Makem wanfala seif an kiln plus lo go lo toilet

Taim lo gatin kwetiv, lo kolom
 Ministry of Environment, Climate Change, Disaster Management & Meteorology (MECDM), 20021
 Royal Solomon Islands Police Force (RSIF), Honiara 22114, Auki 40400, Tulagi 32114, Buada 35142, Nara Kira 50134, Lata 53021, Gao 40771, Taro 62100
 Artist: Eddie Moke



Appendix 7. Permitting and compliance

Permitting and compliance will be according to the CITES permitting system and other requirements specified in the *Wildlife Protection and Management Act (amendment) 2017* and the Fisheries Regulations. There are procedures and processes which govern this system which is administered by the responsible Government Authorities (MECDM & MFMR) to ensure proper documentation, approval, and efficiency in serving the interest of the public. Only authorised officers from MECDM and MFMR will assess and endorse or approve the permits.

The following permits provide an important regulatory mechanism for the MFMR and MECDM to manage human-crocodile interactions in the Solomon Islands.

1). Wild harvest of *Crocodylus porosus*

The permit for this activity is from the MECDM and allows for the wild harvest of *C. porosus*. Permit applications must include necessary information such as the purpose, person(s) involved, methods of harvesting and the locations. Permits are valid for 1 year and renewal is subject to an assessment of the applicant's compliance record with the previous permit.

2). Keeping of live *Crocodylus porosus* from wild harvest

A permit for this activity is from the MFMR and allows for the keeping of live *Crocodylus porosus* sourced from legal wild harvest. The permit is one year or more with terms and conditions imposed. WMPA Act also facilitates a process for obtaining permits in compliance with its regulation for captive breeding, holding facilities, and approved persons.

3). Export permit

A valid license holder will apply for an export permit from MFMR who will then issue the permit after satisfying all the required processes completed by the MFMR inspectors. MECDM will then issue a CITES permit for trade after satisfying CITES requirements.

There is an SOP for specific components of the permit process that guide inspectors, exporters and officers involved with the initial application for export to the issuance of the export permit from MFMR and CITES permits from MECDM.

Exporters must ensure that consignment declarations are made prior to inspection that verify the necessary requirements such as: species name, total volume and value, price per unit, purchase information (domestics/provinces), and country of import and importing company. The Director of MFMR must be satisfied that all information complies with the permit requirements before issuing an export permit.

4). Eco-tourism and farming

The management plan requires service providers to have permits from the relevant government agency for wildlife removal from the wild.

It was recommended to undertake nation-wide capacity building on ranching and management program, to equip communities and potential exporters on how to ranch and export crocodile through handling, breeding processes and the required regulatory processes in Solomon Islands and obligations under conventions.

Tenure systems and socio-economic

Customary tenure system dictates the ownership of land by tribes or clans. It is characterised by the boundary of ownership, controlled access, self-monitoring and enforcement of rules and regulations. The system is used by communities for resource management and involves harvest



restriction of certain aquatic resources over a period.⁵ Integration of customary or community-based resource management and science is now being used for resource management in the Solomon Islands. This is a co-management system between scientific government agencies such as the Ministry of Fisheries or other relevant organisations and the communities. The Ministry of Fisheries provide scientific stock assessment and advise communities on the sustainable harvest quota or management regimes. Communities through customary tenure system or other established governance system in the communities implement the management regimes provided by the technical agencies.

5 Gregory Bennett, *Customary marine tenure and contemporary resource management in Solomon Islands*. Proceedings of the 12th International Coral Reef Symposium, Cairns, Australia, 9-13 July 2012 22A Cultural, political & historical dimensions of coral reef management. Department of Geography, Tourism and Environmental Planning, University of Waikato New Zealand and The WorldFish Center, Honiara, Solomon Islands.

Appendix 8: National Consultations List of Participants

Name	Organisations
Melvin Zama	Ministry of Environment Climate Change Disaster Management and Meteorology(MECDM)
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Trevor Maeda	Ministry of Environment Climate Change Disaster Management and Meteorology(MECDM)
Rix Rolland	Ministry of Environment Climate Change Disaster Management and Meteorology(MECDM)
Ivory Akao	Ministry of Fisheries and Marine Resources
Paul Tua	Ministry of Fisheries and Marine Resources
Robert Tebano	Ministry of Fisheries and Marine Resources
James Meimana	Ministry of Fisheries and Marine Resources
Alison Kaua	Ministry of Fisheries and Marine Resources
Kerry Sirehite	Royal Solomon Islands Police Force (RSIPF-Interpol)/International Affairs Department, MPNSCS
Cherry Kimisi	Royal Solomon Islands Police Force (RSIPF-Police Maritime Department), MPNSCS
Mary Kivo	Ministry of Women, Youth Children and Family Affairs (MWYCFA)
Nancy Diamana	Green Climate Fund (GCF)/Readiness
Douglas Pikacha	Ecological Solutions Solomon Islands (ESSI)
Catherine Siota	Integrated Forest Management Project (IFRMP)-FAO
Joana Aihunu	United Nations Development Programme (UNDP)
Willie Atu	The Nature Conservancy (TNC)
Simon Vuto	The Nature Conservancy (TNC)
Gumese P	The Nature Conservancy (TNC)
Tsatsa Seimarlie	Plan International
Shannon Seeto	World Wide Fund for Nature (WWF)
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