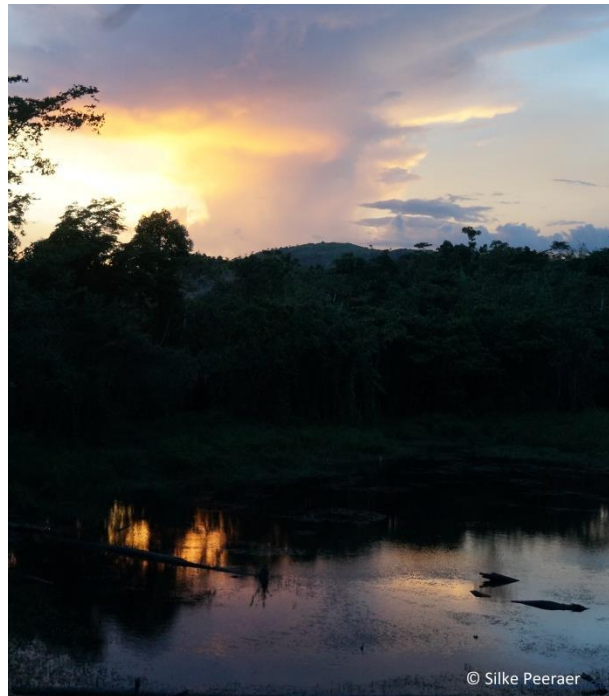




Bachelor Agro- and Biotechnology
Green Management



*The dispersal and habitat preference of
Crocodylus mindorensis in the area of San
Mariano (Catalangan River, Dunoy Lake and
Dadugen Lake) in Luzon, the Philippines*

Silke Peeraer

*Mabuwaya Foundation Lic. Merlijn van Weerd
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Foreword

Making my Bachelor thesis was a great experience that I will never forget. My bachelor thesis is made in a tropical country, The Philippines. A country with a great culture, really nice people, nice environment and great weather. It was a privilege to write my bachelor thesis in such good conditions. Sometimes it was a little tough to produce my thesis due to lack of no electricity, bad internet and the rough terrain, but overall it was a great adventure.

I could never make my thesis if it wasn't for the help and support of Kris Moors my mentor from PXL and Merlijn van Weerd my mentor from Mabuwaya Foundation. And of course the team of Mabuwaya Foundation, that guided me through my fieldwork and helped with making my thesis. Special thanks to these people.

The forest is truly our living heritage. It is a richness of life found nowhere else. It is a source of pride. In our country's forests are life's creations found nowhere else in the world.

We need to be inspired by the courage of people who have fought for the forests. We need to be reminded that the forest is not just about trees or birds and other animals. It is also about our people, our culture and our spiritual roots.

That it is about our life.

Summery

The research is about the dispersal and habitat preference of the Philippine crocodile, scientifically known as 'Crocodylus mindorensis'. This species is critically endangered and is currently on the brink of extinction, there are probably less than 250 adults left in the wild. The Mabuwaya Foundation is a nongovernmental organization trying to improve the status of the crocodile population. They have chosen for a community based approach in order to gain local support and cooperation. My research is a part of the 'croc project', and assists the organization in gaining relevant information about the living environment and ideal natural habitat in which the Philippine crocodile has the best chance to survive. The population size has been declining in the past few years. The question that emerged is: 'if there are so many juveniles released, why is the population still declining? We will try to track their location by researching the dispersal and habitat of the crocodile in the area of Barangay Dibuluan, in the Northern Sierra Madre Natural Park on the Island of Luzon. Research sites include the sitio of Dunoy, Dadugen Lake and Catalangan River. An examination will be made of their quantity and in which life stage the crocodile is during observations. Observations are done mainly during night time, night surveys. With flashlights crocodiles are spotted, this because the retina in the eyes reflects when shined with a flashlight. The reflection that you see then is also called Eye Shine. Locations where the crocodiles are spotted are noted. The highest quantity of crocodiles was spotted in Dunoy Lake. Those crocodiles that were observed, were mostly juveniles. This can be explained by the success of the head start program of the organization. Those observation spots are used to determine the habitat preference, on flow velocity, depth, vegetation, etc. in order to determine what kind of habitat they prefer. Flow velocity is measured by using a floating ball and measure the time it takes for the floating ball to cross 10 m. The depth is measured with a measuring stick, for the vegetation, observations of the surroundings are made and divided in classes. To determine where the closest trail, agriculture field and house are situated, arcGIS is used. By doing random sampling and sampling of the spots where the crocodiles are observed, habitat preference can be determined. In Catalangan River crocodiles prefer deeper parts and slow flowing water. In Dunoy Lake the crocodiles don't mind if the water is more shallow. To gain more information about the crocodile and the area, locals are interviewed. Those people come across crocodiles on daily basis, by questioning some of them and asking about their findings about the crocodiles, more information is gained about the crocodiles and the location where they live. By gaining this information, the Mabuwaya Foundation can determine ideal locations for new release sites, while new areas can be protected through the creation of sanctuary's, in order to safeguard the future of this endemic species.

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Introduction

Our research about the dispersal and habitat preference of *Crocodylus mindorensis* is a part of the croc project from Mabuwaya foundation. Mabuwaya's croc project focuses on the conservation of *Crocodylus mindorensis*, in a community-based way. *Crocodylus mindorensis* is an endemic species for the Philippines and lives only in this region. Therefore, harmonious coexistence between local inhabitants and the crocodiles is crucial, because it enables the crocodiles to continue survival through the protection provided by the communities. The crocodile is facing extinction and it is important to conserve and protect the biodiversity.

To sustain the crocodile population it is important to sustain the wetlands. The wetlands are the only habitat of the crocodiles. The crocodile, and many other plant and animal species, will benefit from the protection of this type of habitat. Using the ecosystem approach also protects the other species, in the same habitat. Water is an important factor for the crocodiles, but also in the daily life of humans, and the communities around those areas will benefit from improving water quality. Water is a daily need and it is important that it is clean and meets the standards of safe drinking water. These are some of the many reasons to support and help the crocodiles and especially the croc project because it involves the bigger picture.

The research is about the dispersal and habitat preference of *Crocodylus mindorensis* (the Philippine freshwater crocodile). The research takes place in Dunoy Lake, Catalagan River and Dadugen Lake in Isabela Province in the Philippines. The research questions of this project are:

- How many Philippine crocodiles are there in Dunoy Lake, Catalagan River and Dadugen Lake in San Mariano, Isabela, the Philippines?
- What is the habitat preference of Philippine crocodiles in the research area?

The ultimate goal of the research is to improve the habitat of the crocodile and to get more information of their dispersal and the number of crocodiles in the area. The species is critically endangered, so it is important to gather information to conserve and improve their preferred habitats and to look at the success of the croc project and the work of Mabuwaya foundation. The Philippine crocodile is something to be proud of.

1 Literature Study

Here will follow a general background of the Philippines and a general introduction to *Crocodylus mindorensis* and the foundation that protects/conserves the crocodile.

1.1 The Philippines location and environment

The Philippines is an archipelago located in south-east Asia (see figure 1 orange circle). It's a tropical country with wet and dry seasons. Where the project is located, in Isabela state, there is no dry season but instead a very pronounced maximum rain period from December to February. There is not a single dry month, minimum monthly rainfall occurs between March (summer) and May. The Philippines is a developing country with an economical focus on agriculture. The country produces mainly rice and corn. The Philippines is famous for their rice terraces in Banaue and is one of the main producers of rice in the world. There are a lot of forests converted to agriculture, and because of the high deforestation rate that goes with it, a lot of high value ecosystems and species disappear. That is why it is so important to protect the species that are endangered by this habitat loss, this is one of the main reasons for conservation (Mabuwaya Foundation, 2014, Planet, 2014).



Figure 1: Global location Philippines (orange circle) (Ezilon, 2009)

Because of the habitat loss, is the Philippines a country with a lot of biodiversity hot spots and many endemic species. This is because there are different forest types, and every habitat contributes to the grand structure of the natural environment of the Philippines, and possesses individual climatic features that enable a unique set of plants and animals to survive (Haeney and Jr, 1998).

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Figure 2: Map of the Philippines (orange circle is Luzon) (world, 2014)

Crocodylus mindorensis is one of the endemic species of the Philippines. The area where the crocodiles are still present is in the vicinity of the Sierra Madre and in Mindanao. The Sierra Madre is a national park located in the province Isabella State, on the island Luzon (see figure 2 for a general overview from the Philippines and where Luzon is located (orange circle)). In the Sierra Madre live endemic species like the crocodile itself, the Narra tree, the Isabela Oriole, etc. (Mabuwaya Foundation, 2014, Haeney and Jr, 1998, van Weerd, 2010).

1.2 Mabuwaya Foundation

Mabuwaya Foundation is an organization that originates in 2003. The vision of the organization is achieving healthy ecosystems and a livable environment for people and wildlife. A sustained biodiversity conservation through local governance and by responsible individuals that care for each other with mutual respect (Mabuwaya Foundation, 2003).

The Mission is to promote effective conservation of endemic and threatened species of wildlife in the Philippines. The foundations achieves this by raising awareness, mobilizing support, building capacity and promoting the sharing of responsibilities for biodiversity conservation by all stakeholders for the common good. The goal is to conserve the critically endangered Philippine crocodile and other threatened species (Mabuwaya Foundation, 2003).

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The organization participates actively in biodiversity conservation and environment protection efforts. The objectives are first of all to generate knowledge of the Philippine crocodile and other threatened species and their habitat as a basis for the conservation program. Secondly, the foundation wants to implement environmental education, capacity building and conservation activity programs. In addition to this, they create and enhance synergy between the activities of the governance, private sector, local communities and civil society groups to support environmental protection and sustainable development. Moreover, they develop the Mabuwaya foundation as a sustainable leading local institute to push the protection and conservation of the croc and other threatened species and habitat. A final point is to engage local and international donors to support long term efforts to conserve the Philippine crocodile and other species (Mabuwaya Foundation, 2003).

The priority of the organization is the conservation of *Crocodylus mindorensis*. The Crocodile Rehabilitation, Observance and Conservation (CROC) project aims to conserve the critically endangered Philippine crocodile in its natural habitat. To conserve the crocodile, research is necessary to get more information on how the crocodiles live and what their needs are. Mabuwaya makes it possible for students and volunteers to learn about the crocodile. Studies are done on different topics, some about fish reserves, how the people coexist with the crocodile, on the success of the rearing station, etc. This way they can optimize their projects to respond to the biggest needs (Mabuwaya Foundation, 2003).

The croc project is done in a community based way to support the livelihood of the local communities. The foundation protects/conserves the crocodile in collaboration with the communities, it makes the conservation sustainable. Mabuwaya has a lot of different projects, some examples are developing better land use, improving habitats for the crocodiles, developing protected areas, etc. The ultimate goal is for people and the crocodiles to coexist in an harmonious way. To achieve this, communication, education and public awareness programs are really important to generate and sustain support in the communities (Mabuwaya Foundation, 2003).

Other projects of Mabuwaya foundation are mainstreaming climate change and biodiversity planning of the Philippines, tree planting projects and Biodiversity surveys. These projects are developed in collaboration with other organizations like Isabela University, The Department of Environment, etc. (Mabuwaya Foundation, 2003).

1.3 The Agta

The Agta are an indigenous nomadic tribe, of the Philippines, that live in the Sierra Madre. Their livelihood exists of catching fish, hunting, collecting fruits and vegetables, etc. Settlements are located along forest streams. The Agta have often a detailed knowledge of the occurrence and behavior of the crocodiles in their ancestral domains.

Agta fishermen (See figure 3) regularly encounter crocodiles underwater but are unconcerned about the risks. Fishermen have the habit to request permission from the crocodiles to catch fish and ask to be left alone in the water. The Agta claim that crocodiles will not attack them, Agta know individual crocodiles and say that these animals do not pose a threat to them. The Agta believe that crocodiles never forget and always take revenge when somebody does harm them, that is why it is so important to respect the crocodiles.

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The hunter-gatherer lifestyle of the Agta has relatively little impact on crocodiles and wetlands. People do not eat crocodile meat, but when a nest is found the eggs are collected and eaten. In general, the Agta are indifferent towards the crocodiles that inhabit their ancestral domain (van Weerd and van der Ploeg, 2012, Minter, 2010).



Figure 3: An agta elderly. Photo by Maja de Belder in Catalangan river (Peeraer, 2014, Belder, 2014)

1.4 *Crocodylus mindorensis*

The Philippine freshwater crocodile (*Crocodylus mindorensis*) is a critically endangered species and endemic to the Philippines (IUCN, 2013). *Crocodylus mindorensis* is among the least studied crocodile in the world. Before 1982, no research had been conducted on the species at all. The available information is further limited by the rarity of the species. Almost all of the information of the crocodile in the wild is sourced by Mabuwaya foundation (Staff, Students and Volunteers) (van Weerd and van der Ploeg, 2012).

1.4.1 Description

Crocodylus mindorensis is a relatively small crocodile, that reaches an average length of 1.5 – 2.5 meters as an adult. Adult males (Figure 4) can reach a maximum length of three meters and can weigh more than 100 kg. The dorsal color is dull brown, with darker transverse dorsal bars on the back and tail, the ventral surface is white. The young crocodiles are more yellow to light brown (Banks, 2008) (van Weerd and van der Ploeg, 2012).



Figure 4: Adult male. Photo by Merlijn van Weerd in Disulap river San Mariano (van Weerd and van der Ploeg, 2012)

1.4.1.1 Taxonomy

Crocodylus mindorensis was described by Karl P. Schmidt in 1935 on the basis of a specimen collected earlier on Mindoro island, and named the species after this location.

Table 1: Taxonomy *Crocodylus mindorensis*

Class	Reptilia
Order	Crocodylia
Family	Crocodylidae
Genus	<i>Crocodylus</i>
Species	<i>Crocodylus mindorensis</i>

(IUCN, 2013, van Weerd and van der Ploeg, 2012)

1.4.2 Ecology

In this section some information of how the crocodiles interact, what they eat, and where they live, etc. is discussed.

1.4.2.1 Mating and nests

When *Crocodylus mindorensis* is 1.5 meter long, the croc is mature and able to reproduce. Courtship and mating season for the Philippine crocodile in Luzon is from January to March. The crocodiles court for about half an hour by rubbing their bodies together and then mate in the water. Crocodiles, like other reptiles and birds, have a cloaca, which is a genital opening. To mate successfully, the male and female crocodiles have to press their cloacae together.

After successful mating, the female crocodile makes a nest between April and May. The crocodile has two types of nests, a mound nest or a hole nest. A mound nest is a heap of twigs, dried leaves, grass and soil raked together by the crocodile. A mound nest can be up to 2,7 meters in diameter and 50 centimeters high. A hole nest is dug into the soil and usually covered with grasses and leaves. The hole can be up to 50 centimeters deep.

The nests are made in exposed sand or in between fermenting vegetation, this provides the necessary warmth for egg incubation. Nests are usually situated near the water on the riverbank or next to a pond.

The female crocodile can lay a maximum of 33 eggs each time but the average amount of eggs is 20-26. A crocodile egg is white and smooth and has a hard shell. A crocodile egg is about seven centimeters long and four centimeters wide. After laying eggs inside the mound the crocodile covers the eggs with dried leaves and sand to protect them from predators and to maintain a temperature of around 32°C inside the nest to help the eggs develop. After 70 days the crocodile eggs hatch (around June to August), sometimes the mother will help the babies hatch. The hatchling pushes hard to crack the shell to be able to emerge from the egg. Sometimes the mother carries the hatchlings to the water in her mouth (van Weerd and van der Ploeg, 2012).

1.4.2.2 From egg to adult

There are four life stages in a crocodile's life, the first one is when a crocodile is born, at this stage, it is called a hatchling (figure 5). When it is born it is only 25 cm long and it weighs 60g. The crocodile remains a hatchling until it is one year old. The crocodile is called a juvenile if it is less than one meter long. It can take 3 to 5 years to reach this size, depending on the conditions the crocodile lives in. Crocodiles will also grow faster with a higher temperature. When the crocodile is between 1 to 1,5 meters long, it is called a sub adult. A crocodile that reaches a length of 1,5 meters is classified as an adult and is capable of reproduction. It takes at least seven years for a hatchling to become an adult crocodile. Adult crocodiles can grow to a maximum length of three meters and can live up to 40 years (van Weerd and van der Ploeg, 2012).



Figure 5: A newborn crocodile. Photo by Merlijn van Weerd (van Weerd and van der Ploeg, 2012)

1.4.2.3 Habitat

Crocodylus mindorensis lives in lakes (figure 6), creeks (small streams), ponds (like a lake but smaller), marshes (wetlands) and rivers. The crocodile is usually found in upland areas in hilly and mountain areas from sea level up to at least 400m in the Sierra Madre. But the crocodile is also present near the coast in mangroves and has even been seen in the sea (moving between creeks). Small crocodiles (hatchlings & juveniles) need quiet water, such as stagnant ponds, to grow up safely. Adult crocodiles can also live in fast flowing rivers with rapids and deep pools lined by limestone cliffs. The crocodiles use cavities in river banks to hide. These are often dug by the crocodiles themselves and are called burrows, they can be found in sandy and clay river banks. Crocodiles also use natural hiding places such as caves and vegetation to hide in or between it (van Weerd and van der Ploeg, 2012).



Figure 6: Dunoy lake, one of the habitats where the crocodiles live. Photo by Silke Peeraer in Dunoy lake (Peeraer, 2014)

1.4.2.4 Diet

Crocodylus mindorensis is an opportunistic predator, it will eat whatever it can catch. The main diet of an adult crocodile consists of fish, birds, snakes, wild pigs, cats and sometimes dogs if there are humans living close to a crocodile population. For the hatchlings and juveniles the diet consists of shrimps, smaller fish, frogs, snails, crabs and insects. Crocodiles hunt prey by stalking or by actively chasing their prey. Reptiles need much less energy for their basic metabolism than mammals do as they do not have to maintain a constant body temperature. As a result, crocodiles can go for long periods without food, up to several weeks or even months (van Weerd and van der Ploeg, 2012).

1.4.2.5 Behavior

Crocodylus mindorensis, like other reptiles, are cold blooded animals. They need the heat from the sun to warm their bodies and to raise body temperature to become active. During the day, crocodiles often lay on top of a log or on warm rocks for hours, basking in the sun (this is how they warm their bodies) or float on the water.

When it gets too hot, the crocodiles open their mouths to cool down, through the evaporation of moisture in their mouths, or they go to the shade or in cool water to cool down. In the late afternoon and the first hours of the night, crocodiles are most active. This is when they start hunting for food.

Juvenile crocodiles can be very aggressive to each other and develop territories. They fight against intruders to defend their territories. The fight ends when one of the crocodiles flees or one succeeds in fighting the other one off. Hatchlings are very tolerant to each other and live in groups when they are young.

The crocodile is naturally shy and does not attack humans unless provoked or when it feels threatened. When the crocodiles made its nest, sometimes the parents will protect it and visit the nest a couple of times but not on an aggressive way (van Weerd and van der Ploeg, 2012).

1.4.2.6 Distribution

Crocodylus mindorensis has a limited distribution (figure 7 the red dots present the current populations), in the northern part of Luzon, Isabela state in the municipality town of San Mariano. There it occurs in Dunoy lake, Catalangan river, Disulap river, Ilaguen river and its tributaries. It also occurs on Dalupiri island, Liguwasan Marsh, Palanan (coastal area) and Mindanao (van Weerd and van der Ploeg, 2012).



Figure 7: Distribution of *Crocodylus mindorensis* (van Weerd and van der Ploeg, 2012)

The research will cover the Catalangan River, Dunoy Lake, Dadugen Lake and surroundings, the study areas (Figure 8) are situated in San Mariano, Isabela state. Here will follow a short description of the sites, the further explanation will follow in the chapter habitat preference.

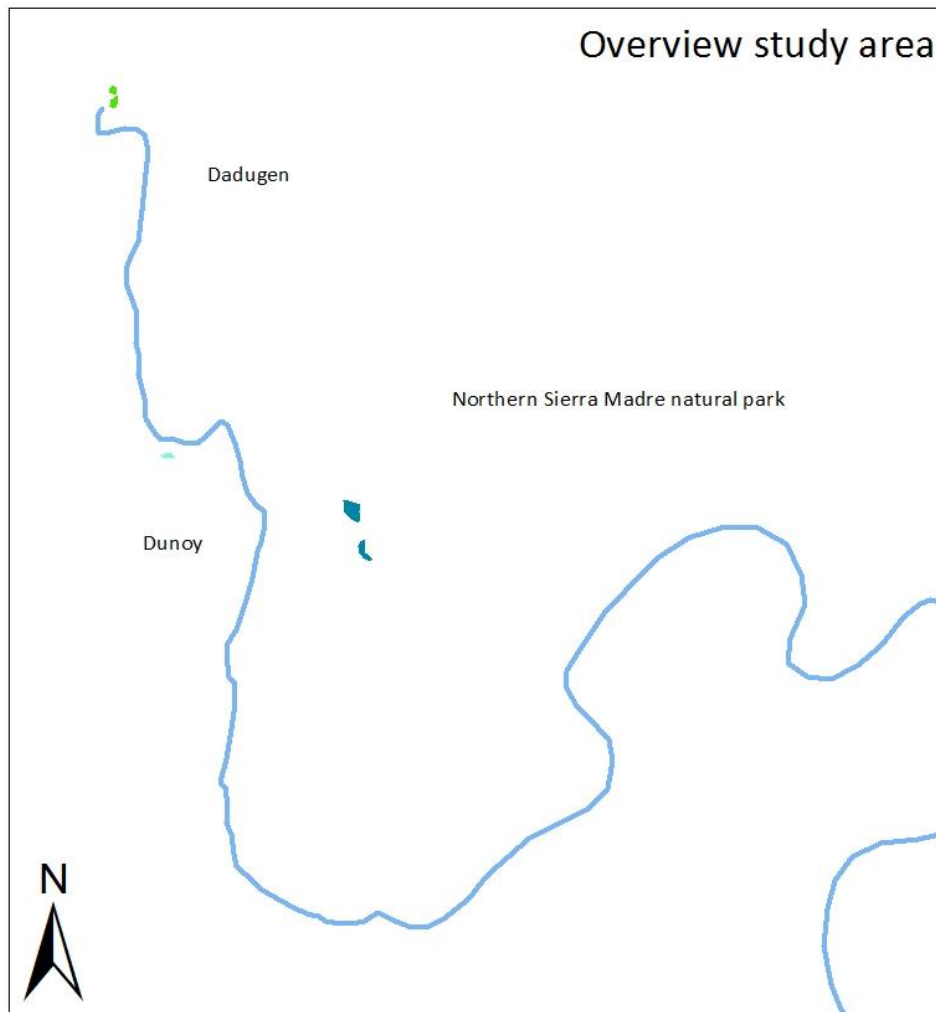
Catalangan River is a river that starts in the Sierra Madre and conflues with Disulap River. Catalangan River connects several creeks, ponds and lakes. Catalangan River is an important river that can be used to go from lake to lake. In the summer the water level of Catalangan River is much lower than during rainy season. In rainy season the flow velocity is much higher than during the summer because of the amount of water in the river.

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The river has some deep pools and really shallow parts, fast flowing areas and really calm areas, with very diverse shores from steep rocks to sand banks. Catalangan River is really remote and not an easy place to reach because of rough vegetation and rocks.

Dunoy Lake is situated inside the Northern Sierra Madre natural park and is surrounded by secondary forest. There are two lakes, Dunoy Lake one and Dunoy Lake two. Dunoy Lake two is shallow, Dunoy Lake one is bigger, deeper than Dunoy Lake 2 (Mabuwaya Foundation, 2003, van Weerd and van der Ploeg, 2012).



Legend

- Catalangan river
- Dungsog lake
- Dunoy lake
- Dadugen lake

Cartographer: Silke Peeraer

Figure 8: Overview study area (Google, 2014, Peeraer, 2014)

The dispersal and habitat preference of *Crocodylus mindorensis* in the area of San Mariano (Catalangan River, Dunoy Lake and Dadugen Lake) in Luzon, the Philippines
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1.4.3 Status

The species is listed as critically endangered by the IUCN (2013), based on two criteria: observed decline in extent of occurrence >80% in three generations and less than 250 adults in the wild, populations highly fragmented and declining.

Based on these factors, it is considered to be the most endangered crocodile in the world by the IUCN crocodile specialist group. *Crocodylus mindorensis* is legally protected in the Philippines and is included on appendix I of the Convention on International Trade in Endangered Species. This means that they cannot be sold or leaving the country without legal documents. (CITES)(Banks, 2008).

1.4.4 History

Crocodylus mindorensis was once widely distributed throughout the Philippines (see figure 9 the red dots are the historical distribution)(Banks, 2008, van Weerd and van der Ploeg, 2012).



Figure 9: Historical distribution of *Crocodylus mindorensis* (van Weerd and van der Ploeg, 2012)

The crocodile was often killed for its skin (crocodile leather), for meat (food purposes), killed out of fear, etc. These are the reasons of the strong declining population of the Philippine crocodile. The main reason was for the skin, cause the leather industry was booming and demand was increasing, so was the population of the crocodiles decreasing (van Weerd and van der Ploeg, 2012).

1.4.5 Problems and threats

Nowadays *Crocodylus mindorensis* is facing a lot of threats, the biggest problem is destruction of the habitat. This is done by people moving in to the area where the crocodile are found. The people that live in those areas, have to produce food.

To fulfill this demand, people change the land use from the area, this by logging and converting the areas to agriculture, like converting wetlands in to rice fields, road building, fishing, polluting rivers etc. People moving in these areas disturb the remaining habitats and disturb and scare away the crocodiles. This makes it very hard for the crocodile to find suitable nesting places, resting places, etc.

The fishing methods are also a big threat, juveniles get be stuck in the net and die. Fishing with dynamite kills everything at one place, so all the food and also a crocodile if it's in that area. And chemical fishing is really polluting and kills a lot of fish and harms the habitat of the crocodile. The fishing can directly kill crocodiles but also indirectly of the consequences of less food that is available. Sometimes the crocodiles are also killed out of fear or to prevent them from eating the domestic pigs and dogs. This is also a direct threat to the crocodile population(van Weerd and van der Ploeg, 2012).

1.4.6 Conservation

Conservation of *Crocodylus mindorensis* is necessary to maintain a population from *Crocodylus mindorensis*. At the moment there are probably less than 100 adults still remaining in the wild, to avoid extinction, protection and conservation work is needed(van Weerd and van der Ploeg, 2012).

1.4.6.1 Community based

The most problems occur between human actions and the crocodile. The problems occur in the areas where the crocodile and the people live as neighbors. Here it is important to talk with those people and discuss where the main problems are and find solutions. Find solutions that fit for both parties so that in this way the safety of the crocodiles and people is guaranteed and both parties benefit from it. Because they are the people that always live with the crocodiles, they have to respect it and protect it. Community based conservation is the most sustainable and efficient way in this case to protect the population.

Community based conservation starts with awareness of the people, this is done by posters (figure 10), puppet shows, calendars, environmental education in schools, etc. This way the community gets to know which value the crocodile has, and that it is something to be proud of. When the people are proud and respect it, they will not kill it and even help it. This is a sustainable base to conserve the Philippine crocodile.



Figure 10: Awareness poster (Mabuwaya Foundation, 2003, Peeraer, 2014)

It will also improve the livelihood of the people, they get grants for the number of juveniles that live in their area, by protecting the water the quality of the water will also improve, they can earn money by guiding students through the area, etc. (van Weerd and van der Ploeg, 2012).

1.4.6.2 Protection

To protect the population some strictly protected areas are necessary. These areas are called the crocodile sanctuaries and the fish sanctuaries. In these areas there are particular rules, and if those rules are not followed there will be consequences like fines.

The fish sanctuaries are established to improve the fish population again in recovery from overfishing. Fish is one of the most important food resources of the crocodile.

The crocodile sanctuaries are directly established by Mabuwaya foundation to protect the habitats of the crocodiles and to protect those areas of conversion to agriculture, from logging, disturbance like people going into the forest collecting non timber forest products, etc. On the map (figure 11) you can see where the sanctuaries are located. The guards of these sanctuaries are the “Bantay Sanktuwaryo”. They are groups of local people that are responsible for monitoring the crocodile sanctuaries and reporting violations to the officials of the local government (Yog Yog, 2014).

There is also a law in the Philippines to protect the Philippine wildlife and their habitats in general and so also the Philippine crocodile. This is republic Act 8485, the animal welfare act of 1998. This makes killing, trading, etc. (harming the population) of the Philippine crocodile illegal, and punishable (Banks, 2008, DENR, 2001).

San Mariano Fish and Crocodile Sanctuaries

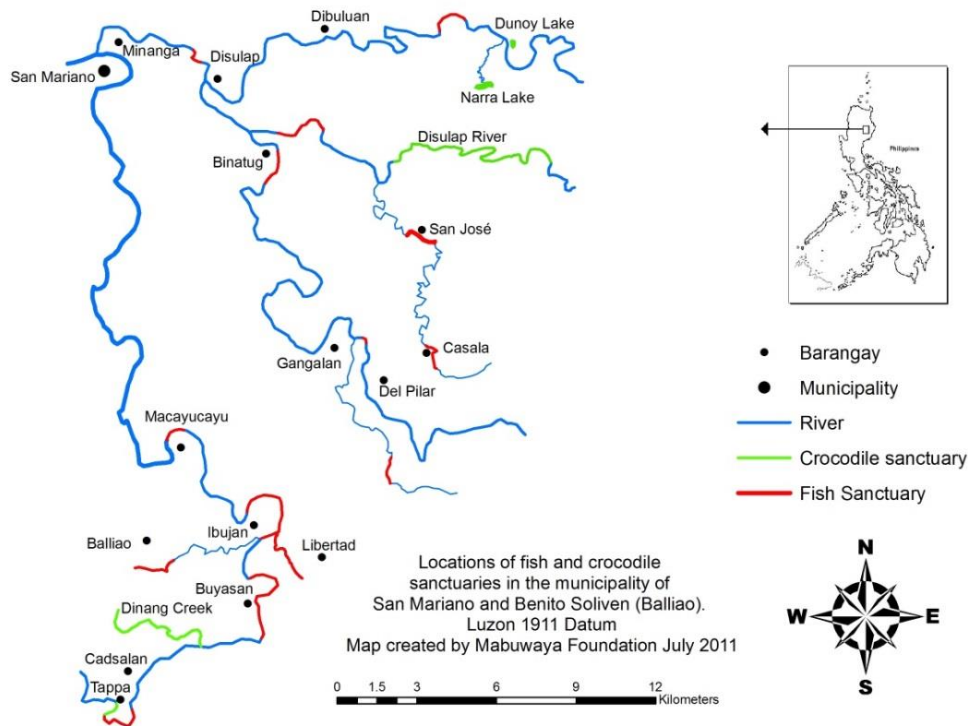


Figure 11: Location Sanctuaries (Mabuwaya Foundation, 2003)

1.4.6.3 Head start program

The head start program from Mabuwaya Foundation is to give the hatchlings a better survival chance, to first let them grow until they are a juvenile in safe conditions and then release them back in the wild. This is done by first locating the nests of the crocodiles. If the nests are located it is important to protect the nest, and then when the eggs hatch, collect the newborn crocodiles and bring them to the rearing station. The first months they stay in barrels inside of the rearing station, here they get shrimps as food and the temperature is similar to the conditions where they would live in the wild.

The crocodiles are then tagged. This is done by cutting away some scales at the tale and create an unique code. This way every crocodile has its own number and can be recognized by its tag. For 18 months they stay in the barrels and after that they go outside in the pond, where they can adapt to living in the same habitat as in the wild. The crocodiles stay in the pond for 6 months, then they are released in the wild (van Weerd and van der Ploeg, 2012). This system will change in the nearby future because it is not good to stay so long in the barrels. So it will change from 18 months in the barrels to 8 months and then in the pond. During their stay in the rearing station, the crocodiles are closely monitored. This is done by measuring and weighing them quarterly. Then the crocodiles are ready to be released back in the wild. The juveniles are then reintroduced in a calm lake, where they can adapt easily before they have to swim in strong flow velocity of the rivers (van Weerd and van der Ploeg, 2012).

2 Dispersal

It is important to know where the crocodiles are situated in an area to know which habitat they prefer. And to know how much crocodiles are located in that area and in which life stages the crocodiles fall within. This is also important information for getting an idea of the population size of an area.

2.1 Description

The dispersal of *Crocodylus mindorensis* is meaning how the crocodiles are spread over the area. In this case the area is Dunoy Lake, Dadugan Lake, Catalangan River and their surroundings. By looking at the dispersal of the crocodiles, where they are located and in which life stage they are, maps are made with how many times they are observed at which location. The difference between the crocodiles will be on life stage (hatchling, juvenile, sub adult, adult) to know exactly which individual it is, you have to catch them and look at their tag (this is really difficult and stress full for the crocodile)(van Weerd and van der Ploeg, 2012).

2.2 Methods and materials

The dispersal is determined with a monitoring method called, day and night surveys. This method is chosen because it is easy and accurate to locate crocodiles this way and the resources are limited (no possibility for radio telemetry). Some information is gained by communicating with the people that live with the crocodiles, the Agta and Victorino Montana (the “Bantay Sanktuwaryo” from Dunoy Lake).

2.2.1 Communication

Some extra information is gathered from the local people by asking some questions like where they think there are more crocodiles at the moment, and the differences between now and when they were young, the crocodile fish relation, etc. More information about their movements is gained and makes it easier to spot the crocodiles.

2.2.2 Monitoring

To know more about the dispersal of *Crocodylus mindorensis* in the study area monitoring is necessary. The monitoring is done by surveys. Surveys are done to have more information of where the crocodiles are and in which conditions. These surveys are done day and night.

Night surveys start when it's dark, that's around 7 p.m. With flashlights crocodiles are spotted, because the retina in the eyes reflects red when shined on with a flashlight. The reflection that you see then is also called 'Eye Shine' (figure 12) (van Weerd and van der Ploeg, 2012).



Figure 12: Eye shine from a juvenile during a night survey. Photo by Silke Peeraer in Dunoy Lake 2 (Peeraer, 2014)

Day surveys are done by looking around in the study areas. At Dunoy Lake there is a watch tower (figure 13). So there the surveys are done from the watch tower with binoculars. During the day it's the easiest to spot crocodiles between 10H and 15H, because then they are often sunbathing. But still it is really difficult to spot the crocodiles because they often hide in vegetation or swim away when they hear or see something.

The surveys are done with Victorino Montana the "Bantay Sanktuwaryo" from Dunoy, he is experienced in monitoring the crocodile population. And with Amante Yog Yog, who works for Mabuwaya Foundation, and works with crocodiles every day.



Figure 13: Day survey at the watch tower with a binocular, GPS and notebook to notated the points of observation Photo by Silke Peeraer in Dunoy Lake (Peeraer, 2014)

GPS coordinates were taken as near as possible to the location where the crocodile was observed. The points are saved as waypoints, and “Luzon Philippines” is the used coordinate system. The locations of the crocodiles were also recorded on a sketch map for a more accurate location because the GPS has a potential error of few meters. ArcGIS was used to map the observation points (Lieshout, 2013).

2.3 Results

After collecting data in the period from March till May 2014, data were processed into use full results. Results that can be easily used by anyone, easy to understand and used for other projects or activities.

2.3.1 Communication

The information/findings that were gained by talking to the people that live with crocodiles in daily life were in general;

- That there are more crocodiles now then a couple of decennia ago. But that nowadays there are more juveniles then adults.
- They see a relation between adult crocodiles and fish population. Where there are more adults, there is a bigger fish population. This could also be explained by crocodiles and fish both liking caves to hide in, and therefore live in the same waters.
- Because there is still illegal fishing happening, and the habitat of the crocodiles are disturbed, the crocodile will move.
- To protect the species more, it would be good to establish more fish sanctuaries because by establishing fish sanctuaries, crocodiles are also protected.
- The river is changed in its physical appearance over the years. The water level is in general lower than decennia ago.
- They observed more crocodiles downstream in Catalangan River then upstream. But they also observe a juvenile next to their home, more upstream in Catalangan River.
- They don't have any problems with the crocodiles in daily life and the ones that don't fear the crocodiles don't mind to fish with the crocodiles.

2.3.2 Monitoring

This table (table 2) shows all the results of the surveys done from march till may. On every location is more or less the same amount of surveys (day en night) performed. At Dunoy Lake there are more day surveys accomplished, because of the watch tower, what makes it really easy to do day surveys. But for the night surveys is it the same amount per site, this is 6 times. Those surveys are done over 3 months (march-may 2014).

The maximum number of crocodiles is determined over a longer period of day and night surveys. Example (Dunoy Lake 1): there is one adult spotted at a night survey and also a sub adult and another night are their 12 juveniles observed. So this is the maximum count for the night surveys of Dunoy Lake is 1 adult, 1 sub-adult and 12 Juveniles. Because you don't know which individual you see (don't know the tag number), so you determine the safe maximum by looking at the max number of crocs counted per life stage in one survey.

Table 2: Results day and night surveys

<i>Location</i>	<i>Environmental conditions</i>	<i>Number of Crocodiles</i>	<i>life stage</i>
<i>Dunoy Lake</i>	Day survey 15/03/2014; Sunny	3	1 Adult, 1 Sub-adult, 1 Juvenile
	Day survey 16/03/2014; Rainy	3	3 Juveniles
	Day survey 18/03/2014; Sunny	3	1 Adult, 2 Juveniles
	Day survey 19/03/2014; Sunny	2	2 Juveniles
	Day survey 20/03/2013; Sunny	4	4 Juveniles
	Day survey 2/04/2014; Sunny	3	3 Juveniles
	Day survey; 4/04/2014 Sunny	5	5 Juveniles
	Day survey 23/04/2014; Sunny	7	1 Sub-adult, 6 Juveniles
	Day survey 24/04/2014; Sunny	5	5 Juveniles
	<i>Maximum</i>		
Night survey 19/03/2014	8	1 Adult, 7 Juveniles	
Night survey 3/04/2014	8	1 Adult, 1 Sub-adult, 6 Juveniles	
Night survey 4/04/2014	10	10 Juveniles	
Night survey 5/04/2014	11	1 Adult, 10 Juveniles	
Night survey 23/04/2014	13	1 Adult, 12 Juveniles	
Night survey 24/04/2014	10	10 Juveniles	
<i>Maximum</i>			1 Adult, 1 Sub-adult and 12 Juveniles
<i>Dunoy Lake 2</i>	Day survey	No observations during the day	/
	Night survey 19/03/2014	5	5 Juveniles
	Night survey 3/04/2014	4	4 Juveniles
	Night survey 4/04/2014	1	1 Juveniles
	Night survey 5/04/2014	4	4 Juveniles
	Night survey 23/04/2014	3	3 Juveniles

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	Night survey 24/04/2014	3	3 Juveniles
Maximum			5 Juveniles
Dadugen Lake	Day survey 20/03/2014; Sunny	2	2 Juveniles
	Day survey 2/04/2014; Sunny	1	1 Juvenile
	Day survey 21/04/2014; Sunny	1	1 Adult
	Day survey	No observations during the other 3 surveys	/
Maximum			2 Juveniles
	Night survey 16/03/2014	4	4 Juveniles
	Night survey 20/03/2014	4	4 Juveniles
	Night survey 1/04/2014	3	3 Juveniles
	Night survey 2/04/2014	3	1 Adult, 2 Juveniles
	Night survey 21/04/2014	2	2 Juveniles
	Night survey 22/04/2014	3	3 Juveniles
Maximum			1 Adult, 4 Juveniles
Catalangan River	Day survey	No observations during the day	/
	Night survey 16/03/2014	1	1 Juvenile
	Night survey 3/04/2014	1	1 Juvenile
	Night survey 4/04/2014	1	1 Juvenile
	Night survey 21/04/2014	1	1 Juvenile
	Night survey 22/04/2014	1	1 Juvenile
	Night survey 24/04/2014	1	1 Juvenile
Maximum			1 Juvenile
Dungsog Lake	Day survey	No observations during the day	/
	Night survey 16/03/014	2	2 Juveniles
	Night survey 2/04/2014	1	1 Juvenile
	Night survey	1	1 Juvenile

21/04/2014	
Night survey	No observations during the other 3 surveys
Maximum	2 Juveniles
Total maximum of whole the study area (night surveys)	2 Adults, 1 Sub-adult and 22 Juveniles

2.3.2.1 Other observations

During the execution of those surveys, a burrow was (figure 14) discovered at Dadugen Lake. A burrow is a hiding place, and is self-made by the crocodile, it is a hole that is excavated out of the bank next to the lake. The size of the burrow, points out that it is an adult housing in the burrow (Yog, 2014).



Figure 14: A burrow at Dadugen Lake. Photo by Silke Peeraer in Dadugen Lake (Peeraer, 2014)

During the execution of surveys at Catalangan River, crocodile tracks (figure 15) were observed. On those tracks you see the tail that drags over the ground and the paws of the crocodile. The size of the tracks show that it is a juvenile (Yog, 2014).



Figure 15: Crocodile trail. Photo by Silke Peeraer in Catalangan river (Peeraer, 2014)

2.3.3 Maps

The maps will show the maximum observations of the survey with the most observations from every location. The maximum count of crocodiles during one survey. This will be shown in dots. On figure 16-19 the results are shown of the maximum observations made in that study area. Figure 20 shows the points of observation of the surveys of Catalangan River.

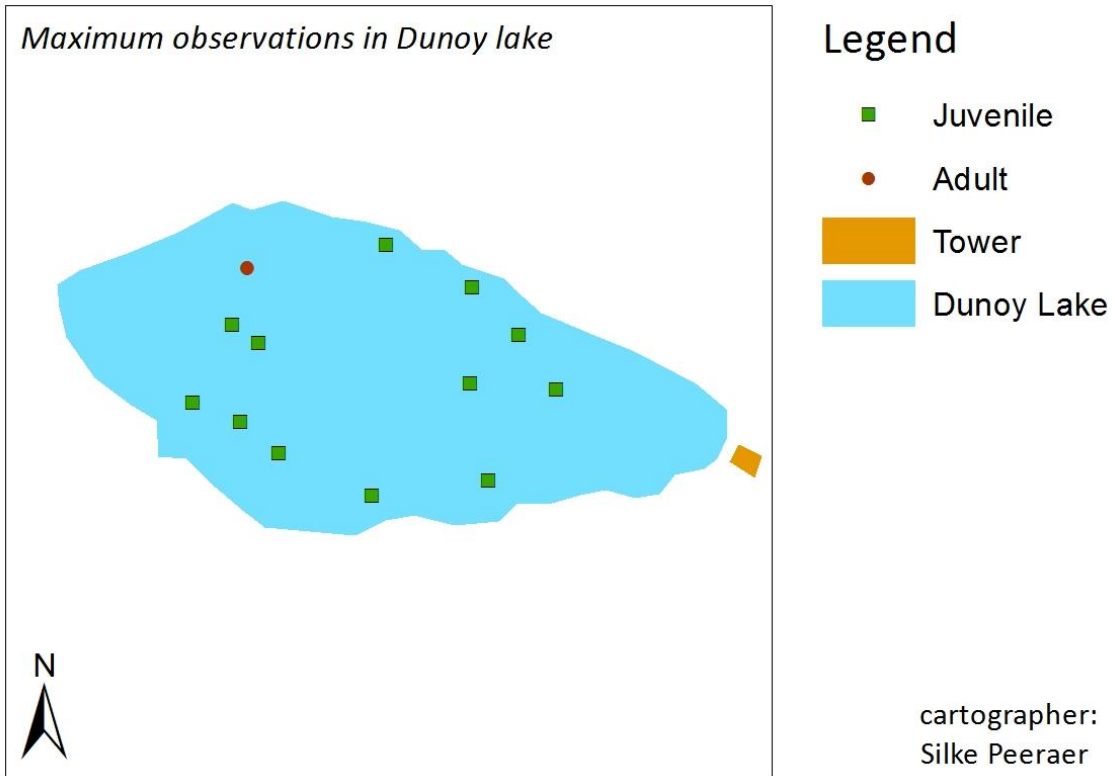


Figure 16: max. observations of the survey with the most observations of Dunoy Lake (Google, 2014, Peeraer, 2014)

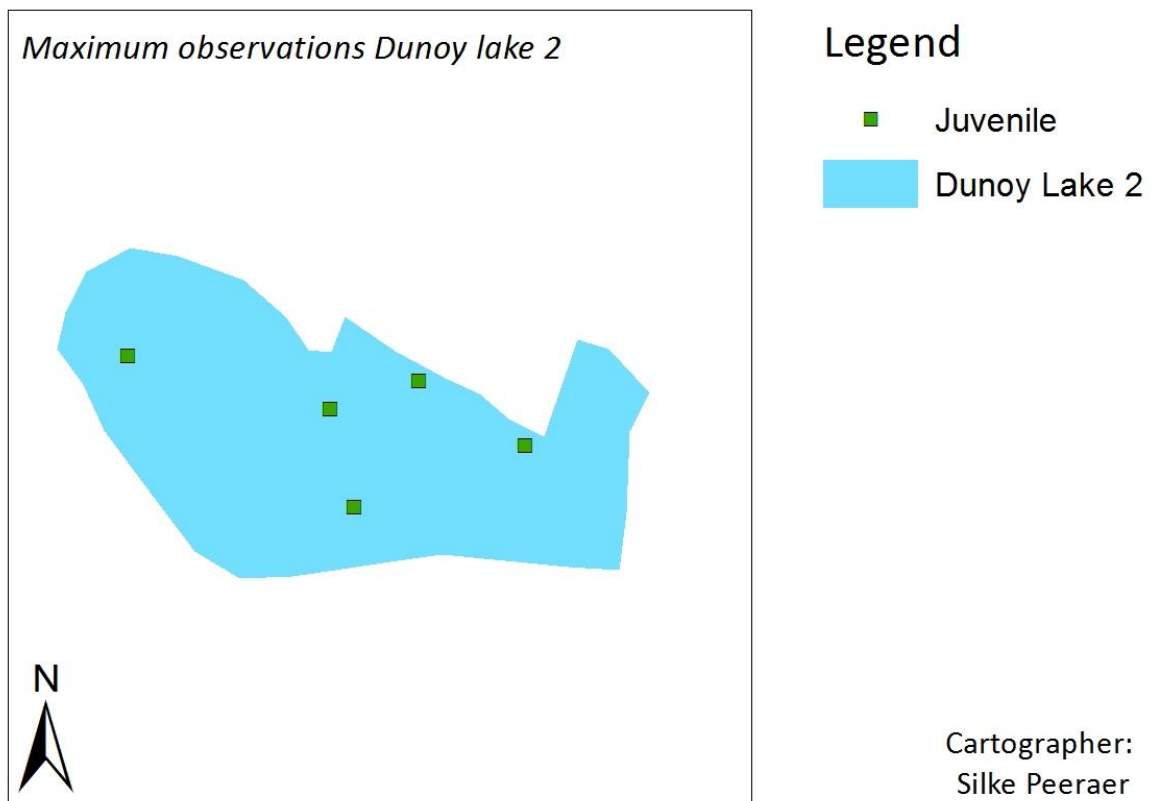


Figure 17: max. observations of the survey with the most observations of Dunoy lake 2 (Google, 2014, Peeraer, 2014)

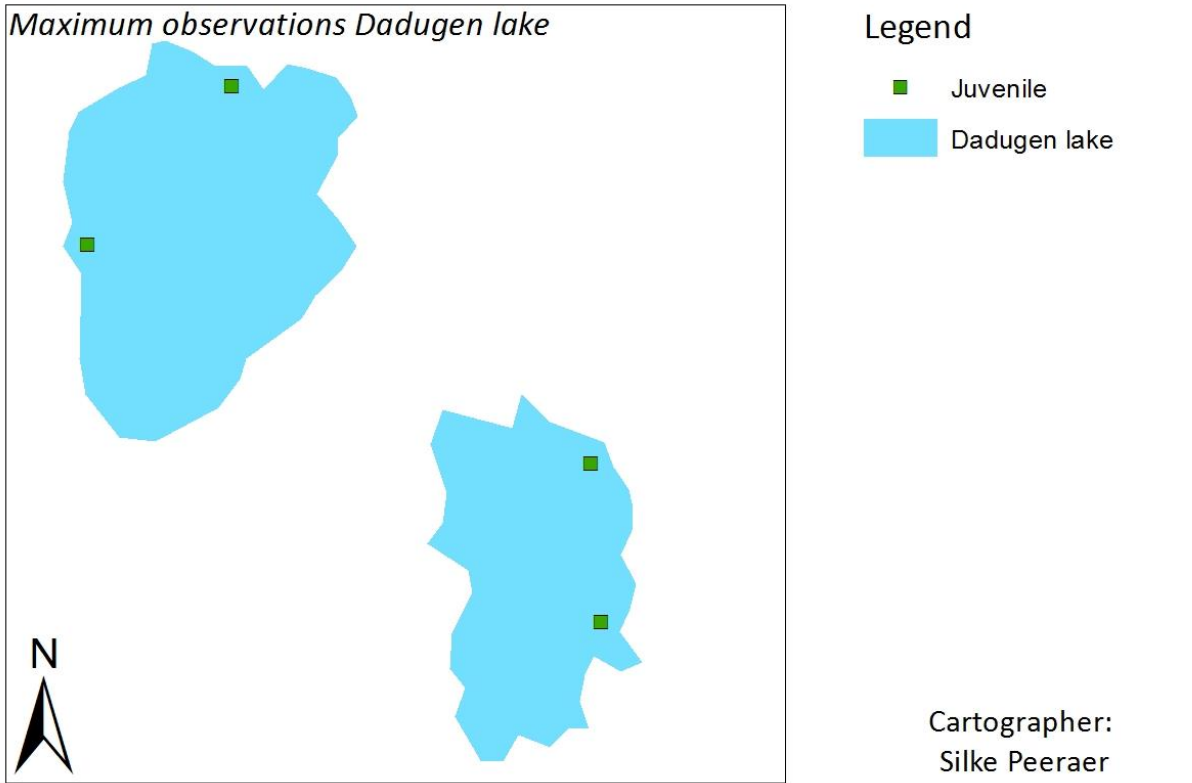


Figure 18: max. observations of the survey with the most observations of Dadugen Lake (Google, 2014, Peeraer, 2014)

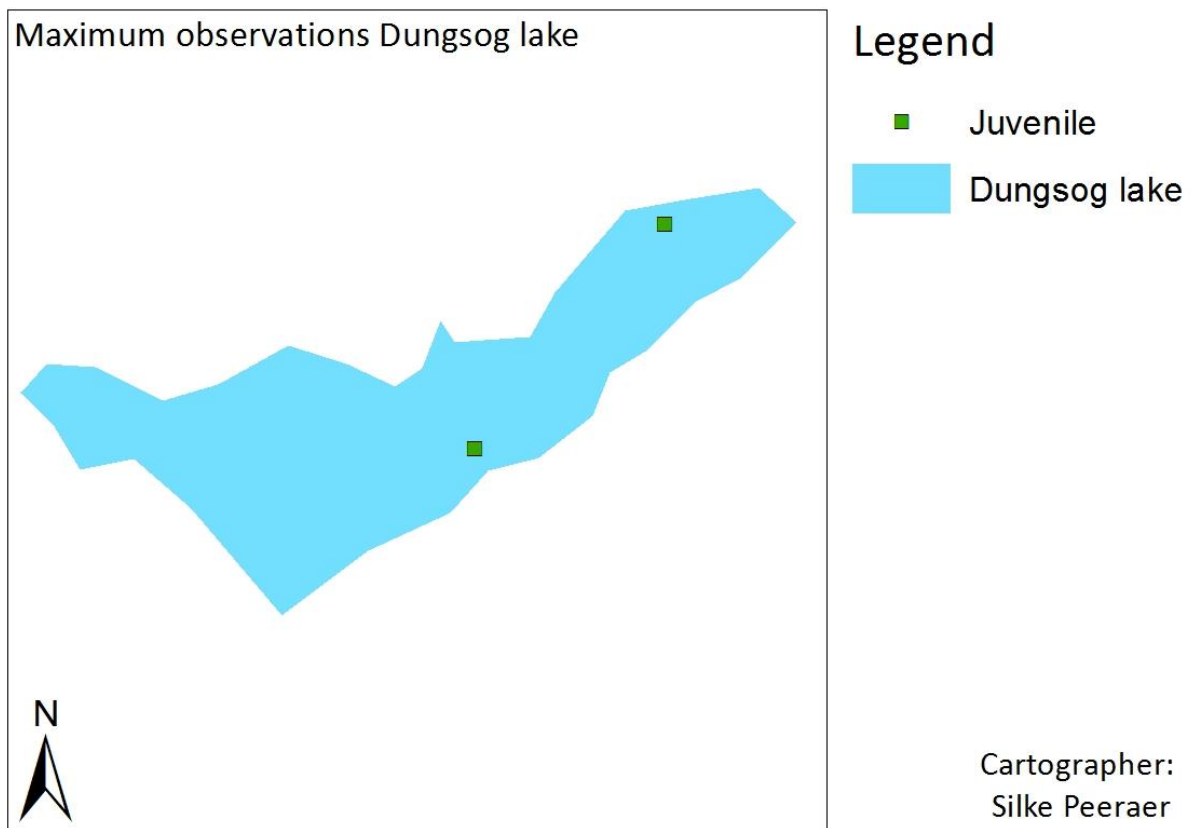


Figure 19: max. observations of the survey with the most observations of Dungsog Lake (Google, 2014, Peeraer, 2014)

The dispersal and habitat preference of *Crocodylus mindorensis* in the area of San Mariano (Catalangan River, Dunoy Lake and Dadugen Lake) in Luzon, the Philippines
Silke Peeraer

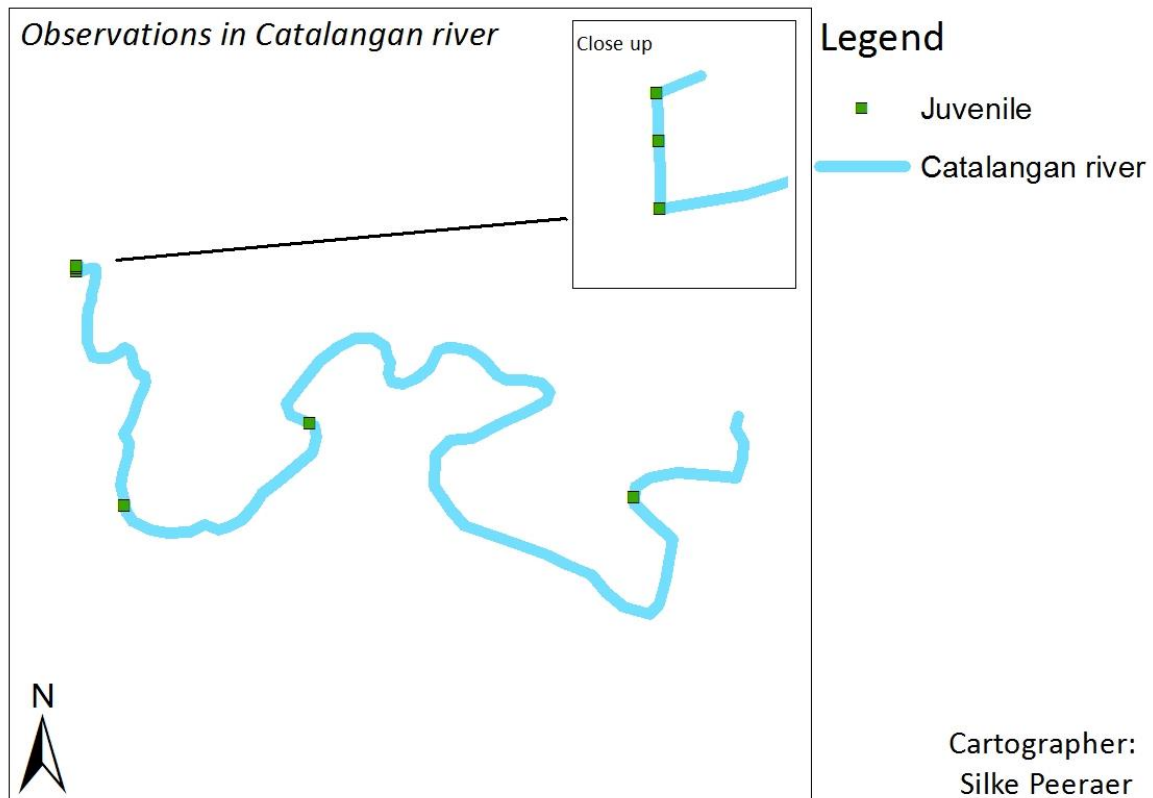


Figure 20: Overview of all the surveys/observations of Catalangan River (Google, 2014, Peeraer, 2014)

Maps with the locations of the observed crocodiles were made by monitoring the crocodiles in study areas. The results of the monitoring show that most of the observed crocodiles are in the juvenile stage. And most crocodiles are observed in Dunoy Lake. All the maximum observations are observations made by doing night surveys. This because it is easier to spot crocodiles by night, because of the eye shine when lighting with a flashlight (Yog Yog, 2014).

3 Habitat preference

To know which habitat the crocodiles prefer, we first have to know where they are situated. Therefore the dispersal of the crocodiles has to be determined, in order to look at the environment where the crocodiles are living in.

3.1 Description

Habitat preference depends on the type of activity performed by the animals. Different habitats may be suitable for different activities such as resting, breeding, migrating or foraging. The habitat preference will be done by describing the locations where the crocodiles are and then comparing those locations with random taken points. Random sampling is a sampling method in which each place/spot of the study area has an equal probability of being chosen. This is done by always taking the next measuring point after 50 m, so that the distance always determines the point where the measurement will be performed. Different habitats can be determined by vegetation surveying (difference between vegetation), temperature difference, water depth, the speed of the river, etc.

These are different parameters in an area that can define where the species prefer to stay. For example for nesting they prefer the area around the lake, or when the current of the river is too fast they prefer to stay in the calm lake (Lieshout, 2013).

Depending on different factors the species prefer different spots in the area, there can even be a difference between the habitat preference within a population, depending on age or size. For example, dominant males have the best spots (Brien et al., 2008, van Weerd and van der Ploeg, 2012).

3.1.1 Characteristics

The habitat is going to be compared on different characteristics like the flow velocity, water depth, width of the river, surface and the vegetation classes of the area. For Catalangan River the flow velocity, water depth and width of the river are determined. For the lakes the depth, the surface and the Vegetation classes of the lake are determined. These characteristics will be measured on random spots at every 50 meters and on the locations where the crocodiles live (Yog Yog, 2014).

3.2 Methods and materials

The flow velocity is measured by using a ball and a chronometer and measure how long the ball takes to get 10 meters downstream. Repeat this 3 times and the average of those 3 measurements is the correct value for that location. To measure the water depth, the depth of the deepest spot is measured, the maximum depth. Depending on the environmental factors of the spot this is done with a stick, or with a stone on a wire. The width is measured with measuring tape, and is measured from one shore to the other. The surface is measured with google earth. Vegetation can be determined by looking at and describing the place where you want to know which vegetation it is. This will be done in vegetation classes, these are decided on which vegetation occurs, and what the biggest differences are (Lieshout, 2013).

3.3 Results

All the measurements are done during a period of 3 months (March-May 2014). This period is summer, and the driest and hottest time of the year. Consequently water levels will be much lower than in the other times of the year.

3.3.1 The lakes

To give a better overview of the results, the results of the lakes will be in one chapter and the results of the river in another chapter.

3.3.1.1 The surface

The table gives an overview of the surfaces of the lakes, this gives a better idea of the sizes of the lakes.

Table 3: Surface of the lakes (Google, 2014)

<i>Lake</i>	<i>Surface in square meaters</i>
Dunoy Lake	2.370 m ² (0,24 hectares)
Dunoy Lake 2	1.118 m ² (0,11 hectares)
Dungsog Lake	287 m ²
Dadugen Lake	402 m ²

3.3.1.2 Vegetation classes

The vegetation is split up in different classes, determined by the biggest differences:

- Closed vegetation = Few tall trees + Bamboo + Bushes;
- open land consists of short grass with no high vegetation;
- Bushes, closed vegetation but low;
- Rocks;
- Tall grasses;
- Swamp;
- Water vegetation;
- Logs;

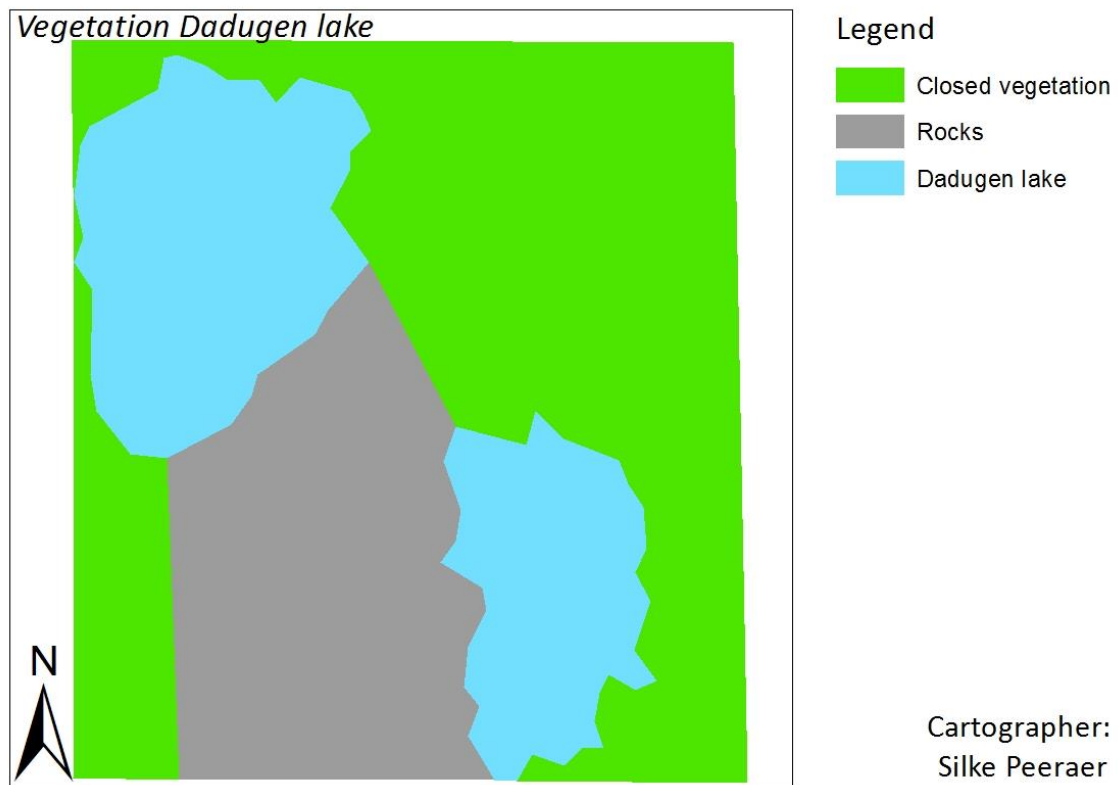


Figure 21:Vegetation map Dadugen Lake (Google, 2014, Peeraer, 2014)

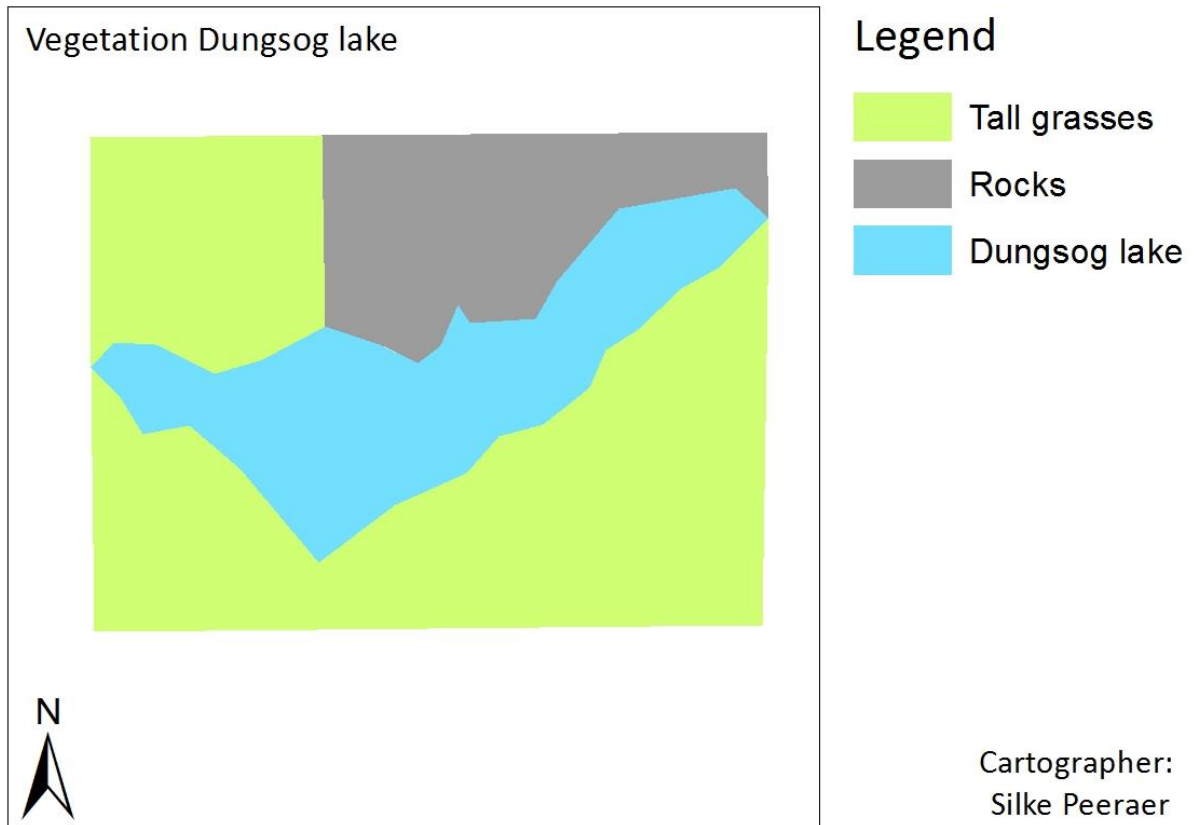


Figure 22: Vegetation map Dungsog Lake (Google, 2014, Peeraer, 2014)

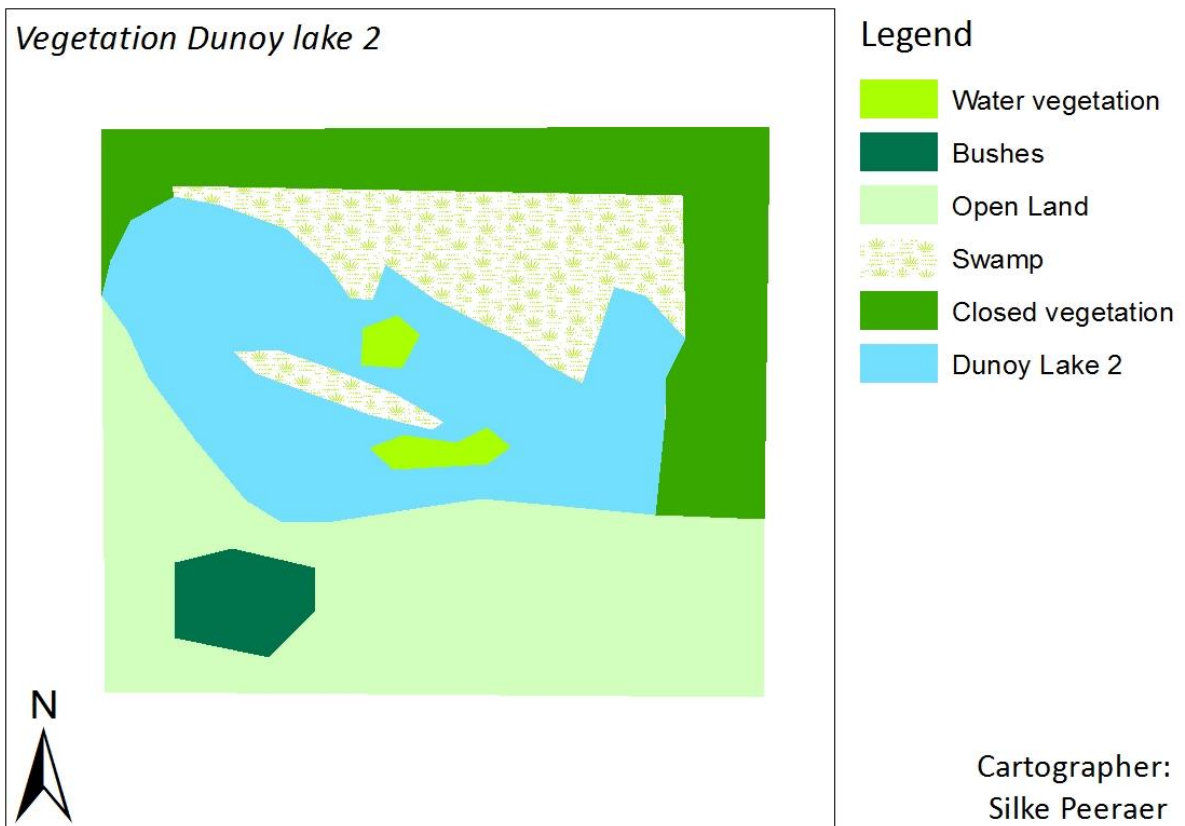


Figure 23: Vegetation map Dunoy Lake 2 (Google, 2014, Peeraer, 2014)



Figure 24: Vegetation map Dunoy Lake (Google, 2014, Peeraer, 2014)

3.3.1.3 Depth

To disturb the crocodiles as little as possible, is only the maximum depth measured as a reference point. On the sketches the maximum depths are indicated.

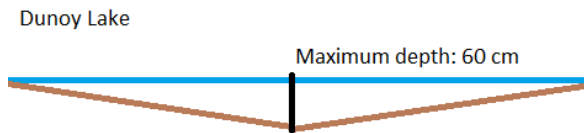


Figure 25: The max. depth of Dunoy Lake (Peeraer, 2014)

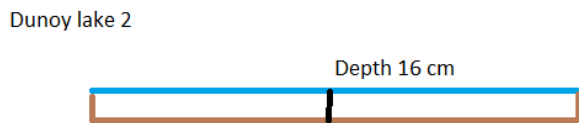


Figure 26: The max. depth of Dunoy Lake 2 (Peeraer, 2014)

Dunoy Lake 2 is an artificial lake and is excavated. This is why the depth is more or less uniform, and only differs some centimeters.

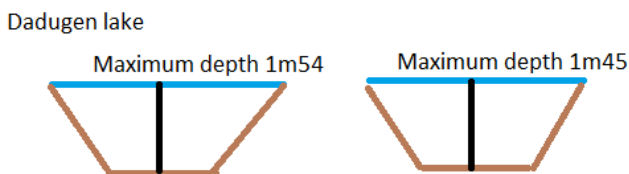


Figure 27: The max. depth of Dadugen Lake (Peeraer, 2014)

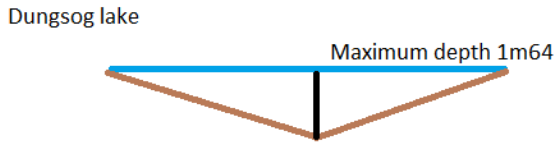


Figure 28: The max. depth of Dungsog Lake (Peeraer, 2014)

3.3.1.4 Total observations

These maps show all the different observation points of the crocodiles, and how many times a crocodile is observed at that point. The maps also show the depth from that point and in which vegetation the crocodile occurred.

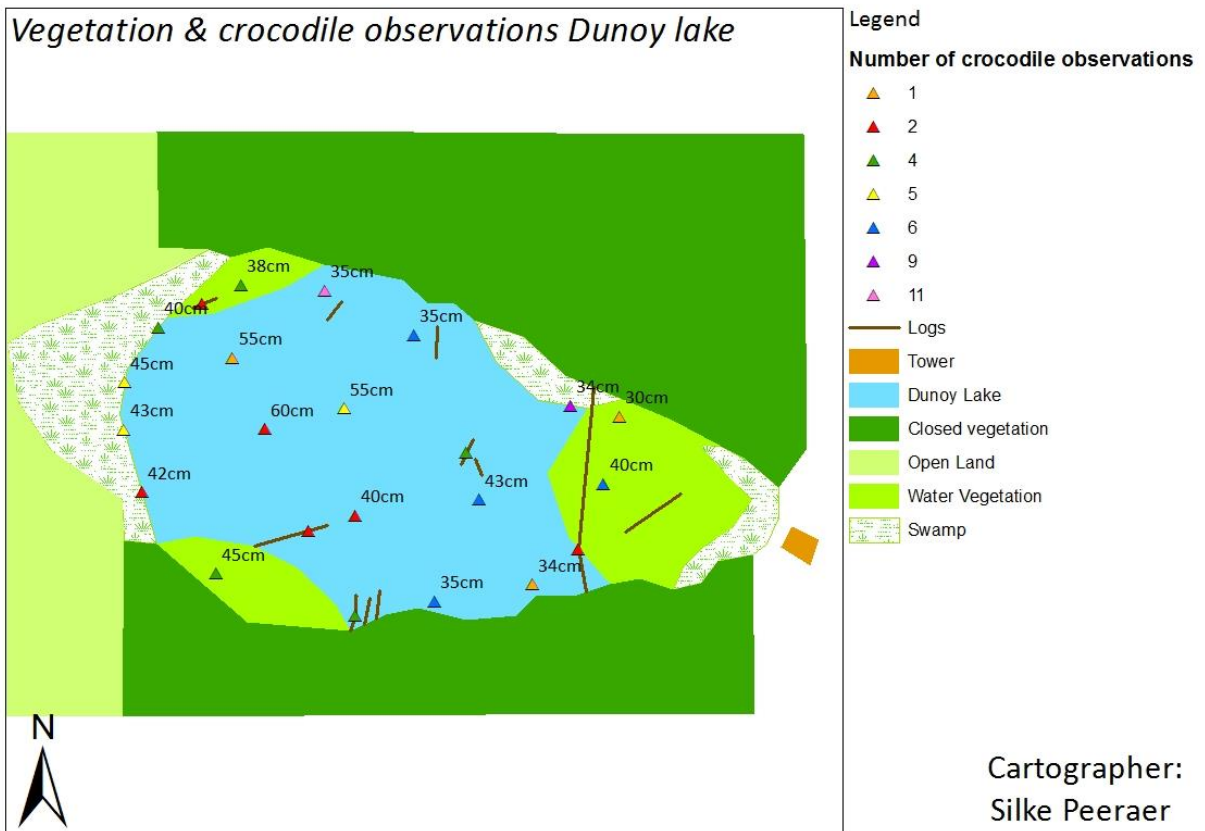


Figure 29: Overview data from Dunoy Lake (Peeraer, 2014)

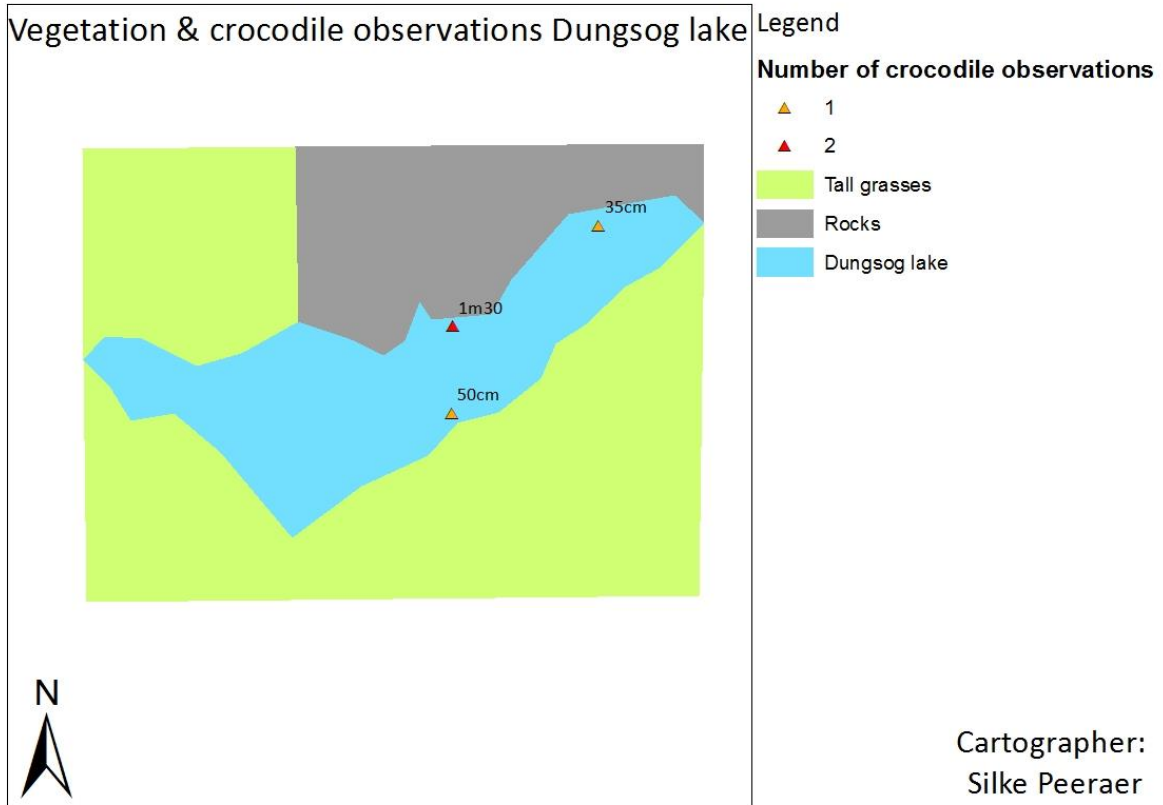


Figure 30: Overview data from Dungsog Lake (Peeraer, 2014)

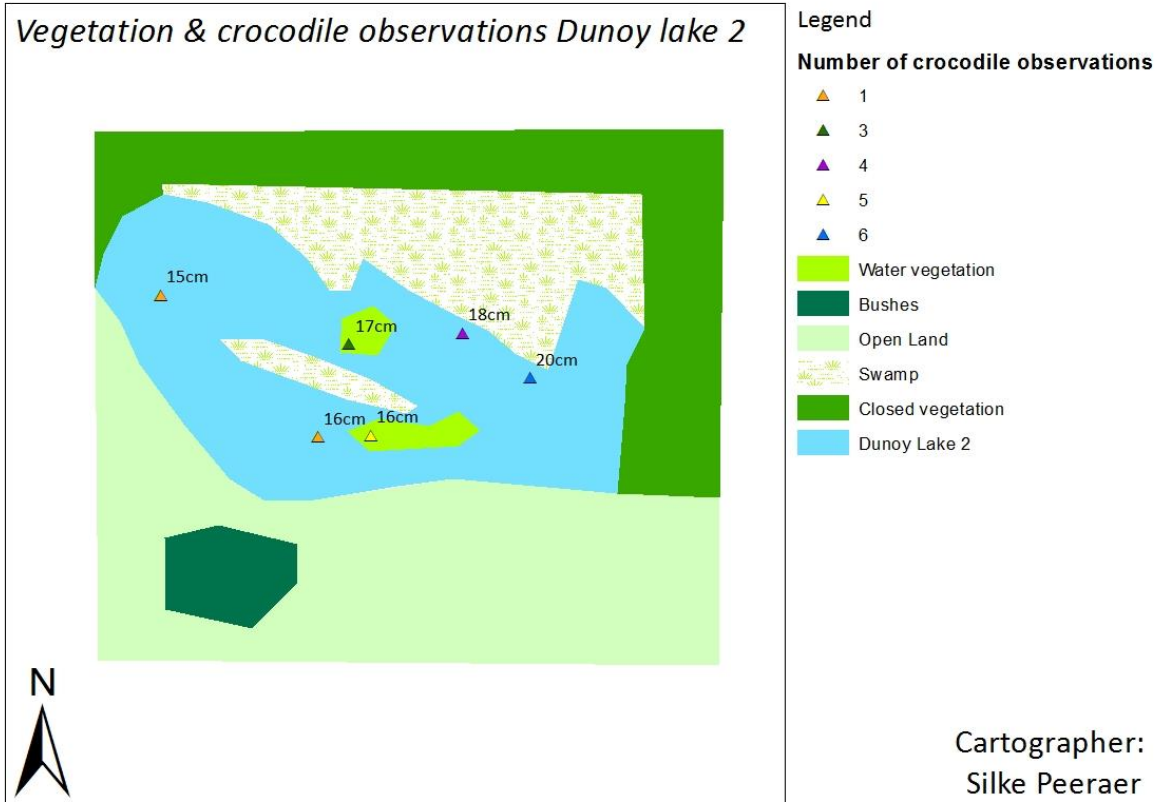


Figure 31: Overview data Dunoy Lake 2 (Peeraer, 2014)

The dispersal and habitat preference of *Crocodylus mindorensis* in the area of San Mariano (Catalangan River, Dunoy Lake and Dadugen Lake) in Luzon, the Philippines
Silke Peeraer

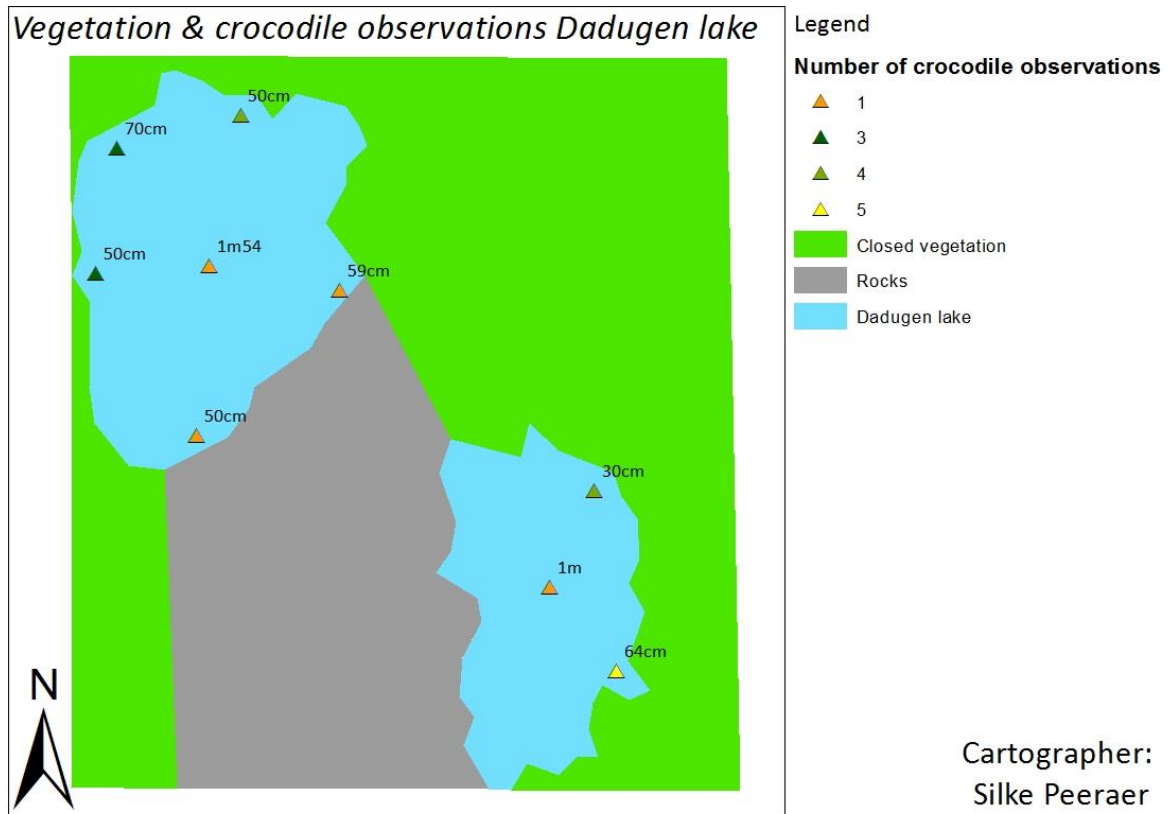


Figure 32: Overview data Dadugen Lake (Peeraer, 2014)

If you look to the vegetation where the crocodiles occur, that most of the time the crocs occur in open water but close to vegetation (doesn't matter which kind) to hide in. In Dunoy Lake occur the crocs in in depths from 30 cm till 60 cm and in Dunoy Lake 2 from 15 till 20 cm, what is really shallow. In Dungsog Lake and Dadugen Lake it is more diverse and deeper.

3.3.2 Catalangan River

For the random sampling of Catalangan River 69 points were measured in the river. These 69 points determine the average characteristics from Catalangan river. And there were 5 observations of crocodiles in the river. For the full excel sheets see appendix 1.

Table 4: Results of sampling Catalangan River

	<i>m/s</i>	<i>Depth in m</i>	<i>Width in m</i>
<i>Average river</i>	0,50	1,02	26,67
<i>Averages of the river where the crocodiles have been observed</i>	0,28	1,24	26,25

To compare this results graphs are made.

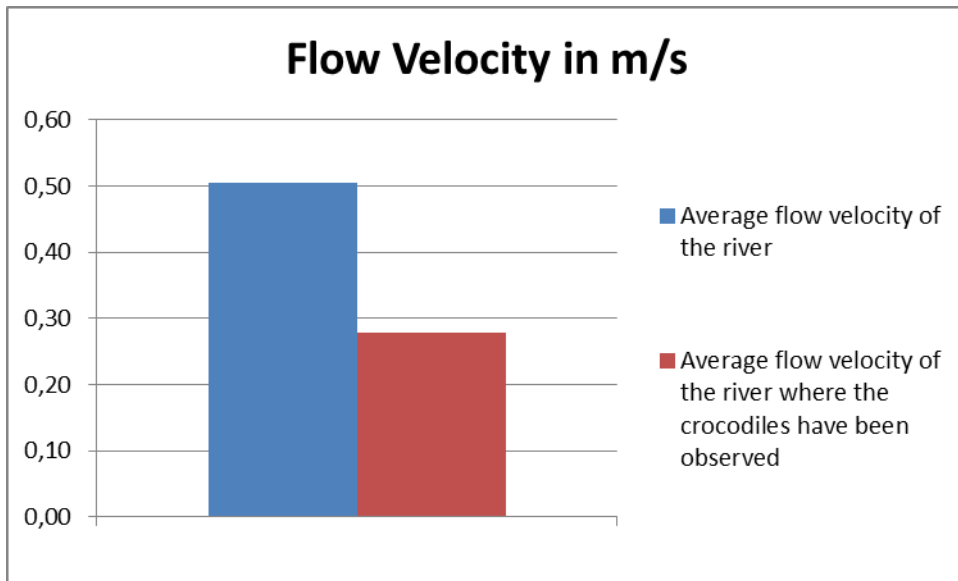


Figure 33: Graph of results flow velocity of Catalangan River (Peeraer, 2014)

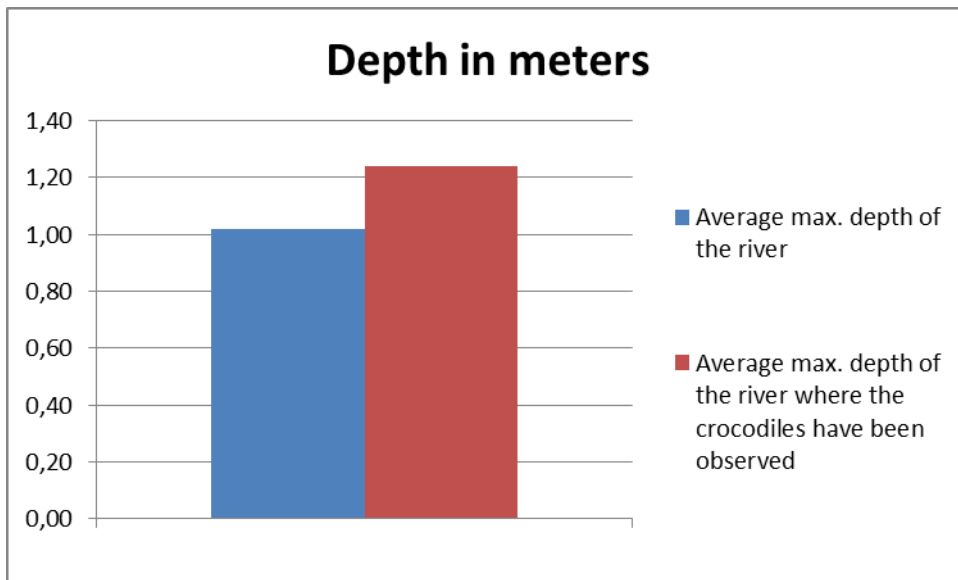


Figure 34: Graph of results Depth of Catalangan River (Peeraer, 2014)

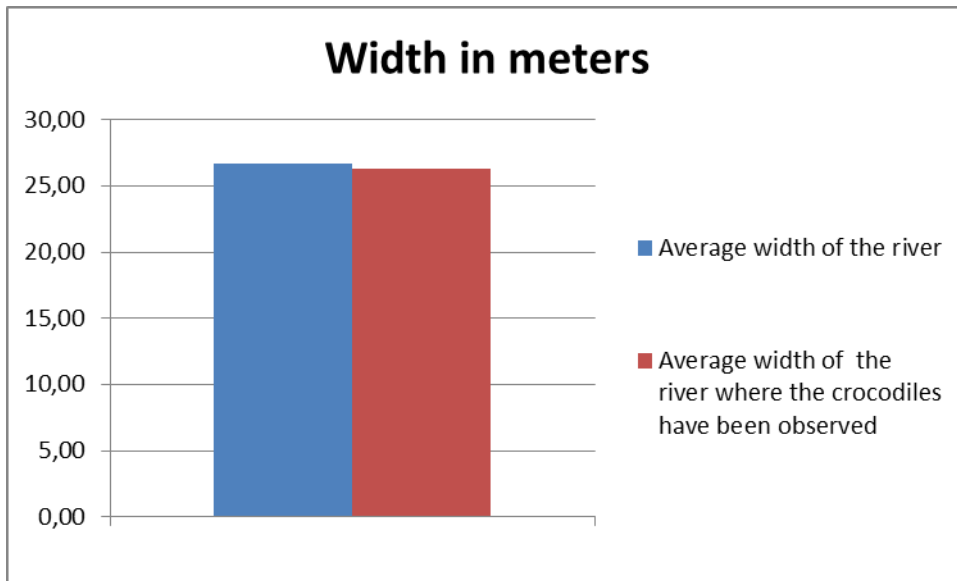


Figure 35: Graph of results width of Catalangan River (Peeraer, 2014)

4 Discussion

The question that drove the research was to determine the number of crocodiles in the study area. By doing the monitoring of the crocodiles living in the study area, it is possible to answer this question. But crocodiles are always on the move between different places and are not always easy to observe so the gained data is a perception of this period of observations. Because it is not possible to know which individual you see and you do not see all the crocodiles every time you do a survey. But because of the frequency of the monitoring, the numbers can be accepted and used as correct data. To answer this question we will look at the data gained by night surveys, because then it is easier to spot crocodiles, and more crocodiles are observed. For all the performed surveys, Dunoy Lake is the one with the most crocodile observations; 1 Adult, 1 Sub-adult and 12 Juveniles.

With the information gained by speaking with the Agta, the research area became bigger. More upstream of Catalangan River, an extra study area was necessary to go to and take a look if there were still some crocodiles present. By doing a survey upstream of Catalangan River, were 2 more juveniles observed.

To determine the preferred habitat of the crocodile, random samplings are done and samplings of the spots of observation. Looking at the results of the river, you can see that the crocodiles prefer almost half the average flow velocity of the river, that they like deeper parts and that the width that the crocodiles prefer is more or less the same as the average width of the river.

Looking at the results of the vegetation determination of the lakes, you can see that the crocodiles prefer logs for sunbathing. And that they prefer to swim in open waters but often close to vegetation to hide in. The crocodiles observed in the lakes occur in many different depths, from really shallow (15cm) to deeper (1m54).

5 Conclusion

By doing the monitoring of the study area, can be concluded that in the study area occurs a maximum population of 2 Adults, 1 Sub-adult and 22 Juveniles. This is the max. number of crocs counted per life stage in one survey over the study area.

In the river the crocodiles prefer the deeper, and slow flowing parts. In the lakes it is important for the crocodiles that there are places to sunbath and places to hide. The preferred depth is much lower than the depth preferred in the river. So in the lakes the depths doesn't really matter. This can be because of food supply, that in the rivers more fish are present in deeper pools and in the lakes the food occurs in the whole lake, not depending on depth.

With the gained information of the habitat preference new release sites for the crocodiles (the juveniles from the rearing station) can be found and other spots can be conserved or managed in a way where the habitat is more optimized to the crocodiles needs. It is important that the release sites fulfill the needs of the crocodiles so that it is easier for them to adapt to wild conditions.

It is really important to involve the local communities, because they live there every day, with the crocodiles. By just talking more with those people, much more information is gathered. Often they have a good view on the current situation and have good ideas to solve some problems. An example is that Victorino Montana the "Bantay Sanktuwaryo" from Dunoy, suggests to have more fish sanctuaries because they protect fish population but also cover the protection of the crocodile. This is better for crocodile conservation.

Dadugen Lake should become a crocodile sanctuary, this because of its many potentials. Dadugen Lake is a good habitat for the crocodiles. It has really deep parts but also more shallow parts, it is really remote and a quit place. It is surrounded by rocks and closed vegetation. The closed vegetation is a good place to hide but also a good place to make nests. The rocks are a good spot to sunbath. By the occurrence of a burrow and observation of an adult and some juveniles, it is sure that it is a good place for crocodiles to life. It's a rather small lake, but is in high tide connected with Catalangan River. Which makes it easy to move to other places.

The Philippine crocodile is a special animal, where it is necessary for more research to do even more and better conservation work. The Philippine crocodile is something to be proud of.

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Appendix 1

Measurments random sampling Catalangan River

Location	GPS	m/s	Depth in m	Width in m
Point 1	fa	0,14	1,55	27
Point 2	fb	0,00	2,2	45,2
Point 3	fc	0,93	0,52	52
Point 4	fd	0,41	0,65	49
Point 5	fe	0,12	0,96	39
Point 6	ff	0,45	0,78	31
Point 7	fg	0,80	0,69	27
Point 8	fh	0,46	0,7	27,8
Point 9	fi	1,17	0,34	18,3
Point 10	fj	1,01	0,42	15,2
Point 11	fk	0,72	0,3	38
Point 12	fl	1,00	0,63	21,2
Point 13	fm	1,18	0,44	21,8
Point 14	fn	0,66	0,86	24
Point 15	fo	0,90	0,84	24
Point 16	fp	0,14	0,97	29,4
Point 17	fq	0,16	0,78	38
Point 18	fr	0,15	0,7	37
Point 19	fs	0,44	0,9	27,6
Point 20	ft	1,00	0,85	30,8
Point 21	fu	0,97	0,77	13
Point 22	fv	0,19	1,7	28
Point 23	fw	0,07	1,7	24,1
Point 24	fx	0,82	1,13	40
Point 25	fy	0,36	1,32	41
Point 26	fz	0,59	0,67	29

The dispersal and habitat preference of *Crocodylus mindorensis* in the area of San Mariano (Catalangan River, Dunoy Lake and Dadugen Lake) in Luzon, the Philippines
Silke Peeraer

Point 27	faa	1,43	0,64	8,9
Point 28	fbf	0,31	1,6	15
Point 29	fcc	0,82	1,1	6
Point 30	fdd	0,53	1,2	30,2
Point 31	fee	0,33	1,8	7
Point 32	fff	0,21	1,9	14
Point 33	fgg	0,31	1,62	10
Point 34	fhh	0,35	0,78	29
Point 35	fii	0,19	1,35	14,6
Point 36	fjj	0,22	4,15	35
Point 37	fkk	0,15	0,85	33,6
Point 38	fill	0,82	0,55	36
Point 39	fmm	0,31	0,75	25
Point 40	fnn	0,89	0,5	21
Point 41	foo	0,26	0,95	36
Point 42	fpp	0,41	0,27	47
Point 43	fqq	0,84	0,48	38,6
Point 44	frr	0,77	0,5	23
Point 45	fss	0,87	0,37	28
Point 46	ftt	0,57	0,61	27
Point 47	fuu	0,42	0,84	32,4
Point 48	fvv	0,26	0,81	33
Point 49	fwv	0,12	1,52	30
Point 50	fxv	0,57	0,64	23
Point 51	fyy	1,44	0,5	24
Point 52	fzz	0,43	0,38	19,6
Point 53	faaa	0,00	2,74	21,5
Point 54	FUA	0,49	0,62	19,2
Point 55	FUB	0,59	0,54	26,5
Point 56	FUD	0,15	1,8	28
Point 57	FUE	0,10	1,3	25
Point 58	FUF	0,06	3,05	34
Point 59	FUG	0,42	0,65	23
Point 60	FUH	0,56	0,83	8,2
Point 61	FUI	0,21	1,53	24
Point 62	FUJ	0,31	1,44	14
Point 63	FUK	0,44	0,21	18
Point 64	FUL	0,26	1,43	17
Point 65	FUM	0,84	0,53	20
Point 66	FUN	0,21	1,5	17,3
Point 67	FUO	0,22	0,84	35,6
Point 68	FUP	0,75	0,66	24,3
Point 69	FUQ	0,51	0,53	39

Average**0,50****1,02****26,67**

Measurements of Catalangan river of the points where crocodiles have been observed

Location	GPS	m/s	Depth in m	Width in m
Point 1	FUCJUV	0,24	0,9	27
Point 2	sketch	0,78	0,31	24
Point 3	sketch	0,30	1,45	23
Point 4	sketch	0,00	1,7	21,5
Point 5	Crocagta	0,35	1,07	32
Point 6	Fcroc	0	2	30
Average		0,28	1,24	26,25

Appendix 2

Mabuwaya Foundation (Director Marites Balbas) won the Whitley Award, during my internship with them. Because of that they interviewed me to know more about the Crocodile and Mabuwaya Foundation.

8 **NIEUWS**
HET BELANG VAN LIMBURG - MAANDAG 12 MEI 2014

STUDENTE PXL BESTUDEERT ZELDZAAMSTE KROKODIL IN FILIPIJNSE JUNGLE

"Soort was bijna uitgestorven"



WE LEREN DE LOKALE BEVOLKING DAT ZE GEEN SCHRIK MOET HEBBEN VAN DE KROKODIL

PXL-Studente Silke Peeraer

Silke Peeraer met een jonge Mindero-krokodil in een opvangcentrum van de bekroonde organisatie Mabuwaya.
Foto's: HbV/Mabuwaya

ISABELA - De zeldzaamste krokodillensoort ter wereld - de Filipijnse zoetwaterkrokodil - wankelde enkele jaren geleden nog op het randje van uitsterving. Nu gaat het iets beter. PXL-studente Silke Peeraer (20) reisde naar de Filipijnen om voor een lokale natuurorganisatie thesisonderzoek te verrichten naar de habitat van het reptiel.

Silke Peeraer werkt op het Filipijnse eiland Luzon samen met de natuurorganisatie Mabuwaya. Deze Filipijnse ngo werd vorige week nog bekroond met een Whitley Award, de belangrijkste onderscheiding wereldwijd op vlak van natuurbescherming. Het werk van Mabuwaya is gericht op het beschermen van Mindero-krokodil of de Filipijnse krokodil. De zeldzaamste krokodillensoort ter wereld was enkele jaren geleden bijna volledig uitgestorven met een resterende populatie van 12 tot 20 dieren. Dankzij de inspanningen van Mabuwaya groeide de afgelopen jaren de populatie weer tot een honderdtal dieren. Bedoeling is om dat aantal nog op te drijven. Daarvoor is geld nodig en hulp. Die krijgt Mabuwaya tijdelijk van PXL-studente Silke Peeraer uit Herentals. "Het scheelde niet veel of de krokodil was uitgestorven. Reden? Eenzijdig is er massaal op gejaagd voor het leer van de krokodillen, anderzijds hebben boeren stukken moerasland veranderd in rijst- en maïselden waardoor de natuurlijke habitat van de Filipijnse krokodil steeds kleiner werd", zegt Silke Peeraer (20) uit Herentals. Zij studeert Groenmanagement aan de PXL in Hasselt en verblijft drie maanden in de jungle om de zeldzame reptielensoort ter plekke te kunnen bestuderen.

Schuw dier
Over de Filipijnse krokodil is nog maar heel weinig bekend. Wetenschappers zijn het reptiel pas in 1982 begonnen bestuderen. Het werk van studente Silke Peeraer is voor organisatie Mabuwaya dan ook van cruciaal belang. "Ik ga zowel overdag als 's nachts op zoektocht naar de dieren. Als we er vinden, dan bestudeer ik de plaats waar ik ze gespot heb. De diepte van de rivier, de snelheid van de stroom, de vegetatie, ik breng alles in kaart. 's Nachts werken we met zaklampen en speuren zo het wateroppervlak af. Als er zitten, heb je ze ook redelijk gemakkelijk gevonden, het netvlies van de krokodillen licht rood op als je er op schijnt", aldus Peeraer. Het onderzoeksgebied bevindt zich voornamelijk in het Sierra Madre National Park, in het noordoosten van Luzon. "Puur natuur. Ik heb in de tropische bossen al van alles gezien: spinnen, kalkkerlaken, wandelende takken. Boeiend vind ik het."

Poppenkast
Wat het werk van Mabuwaya zo speciaal maakt is dat het de lokale gemeenschap betreft bij het behoud en de bescherming van de diersoort. Veel Filipijnen hebben schrik van de krokodil, ze vrezen dat het dier hen aanvalt als ze in de buurt komt. Dat klopt niet. De Filipijnse zoetwaterkrokodil is juist een heel schuw dier en zal altijd wegwachten als het mensen ziet. Het is met drie meter voor een volwassen dier ook veel kleiner dan de 7 meter lange zoutwaterkrokodil die elders in de Filipijnen leeft en wel mensen aanvalt. Met een poppenkast leert Mabuwaya kinderen dat ze geen bang moeten hebben. Over twee weken keert Silke Peeraer terug naar België. "Toch met een beetje tegenzin, want ik beleef hier een geweldige tijd. Ik heb tijdens sommige field trips opgetrokken met de Agta, een nomadenvolk die volledig op zichzelf zijn aangewezen en alles zelf maken met wat ze in de natuur vinden. Ik hoop later te kunnen werken rond projecten in tropische wouden. Dan zal ik sowieso wel moeten verhuizen aangezien die in België dungezaaid zijn (lacht)."

RD

The dispersal and habitat preference of *Crocodylus mindorensis* in the area of San Mariano (Catalangan River, Dunoy Lake and Dadugen Lake) in Luzon, the Philippines
Silke Peeraer

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