

**Progress Report II**  
**Okavango Crocodile Monitoring Programme**

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**OKAVANGO CROCODILE**  
Monitoring Programme

## Progress during the report period

### 1. Crocodile Population Density in the Okavango Panhandle (Progress Report 1 – August 2016)

The OCMP has provided population monitoring data on this population for the past 10 years, with an initial population density estimate for the Okavango provided by Bourquin in 2007. This initial population study allowed for the calculation of a correction factor which can now be used to monitor population trends using faster and more efficient spotlight surveys. Our monitoring programme thus began with the first population density monitoring work using spotlight surveys in 2008. This survey formed the baseline survey for future population assessment for the Okavango Delta Panhandle monitoring surveys using spotlight surveys.

The most recent spotlight survey took place in August 2016 and allowed us to provide the Department of Wildlife and National Parks with an accurate population assessment comparison between the period 2008 and 2016 for the Okavango Delta Panhandle. The results of this survey are available in Progress Report 1 (August 2016).

#### *IUCN Red List*

The results of the 2016 Spotlight Survey have been published in the December 2016, Newsletter of the IUCN Crocodile Specialist Group (Species Survival Commission). The results of this survey have also contributed to the most recent update of the IUCN Red List for Nile Crocodiles in Botswana. Mr Shacks attended the Crocodile Specialist Group Annual Conference in Skukuza, Kruger National Park, South Africa where he presented these results and contributed to the IUCN assessment for Botswana.

### 2. Nesting Surveys

Nesting surveys were carried out for the very important Phillipa channel in October 2016 (Aerial Surveys) and January 2017 (Boat based surveys). The results of these surveys can be found in Appendix 2. The monitoring of nesting sites is critical as 99% of the Nile crocodile nesting sites are in the unprotected area of the Panhandle. This means that the Okavango Nile crocodile population is extremely vulnerable as it faces several anthropogenic disturbances during the critical period of breeding and nesting.

A pilot exercise using camera traps to identify adult crocodiles at nest sites, was carried out in January to identify the correct type of camera trap to use. The team have identified and field tested the camera and will be deploying a set of camera's in the 2017 nesting/ breeding season to begin the process of identifying adults breeding in the Panhandle. Identification can be done using tail pattern ID's on each of the crocodiles photographed.

### 3. Environmental Education

The OCMP carried out an Environmental Education activity and teacher training workshop at Samochima Primary School in the northern part of the Okavango Panhandle. An aquatic food chain lecture was given to

over 100 learners. As part of this environmental education activity an educational poster (Appendix 3) was handed over to the school. The aquatic food chain lecture is based on a lesson plan that has been delivered to schools along the Okavango Panhandle since 2003. The lecture also includes a detailed information session on safety near the river which has been very well received by hosting schools.

The OCMP are in the process of developing grade specific lesson plans for the first three grades of Primary school (Grade R, Grade 1 and Grade 2). These lesson plans are presented to teachers at the Primary Schools for them to carry out the plans with the pupils. Each of the lesson plans is broken up into a series of activities which the teacher will carry out with the students and can measure whether the outcomes of the activities were reached. These plans will be implemented through the schools' environmental clubs.

### Publications

Bourquin, S.L and Shacks, V.A. 2016. Population trends in a previously exploited Nile Crocodile population in the Okavango Panhandle, Botswana. Crocodile Specialist Group Newsletter, Volume 35, no 4.

*In Press:* Shacks, V.A. 2017. The recovery of the Nile crocodile population of the Okavango Delta. African Wildlife. Wildlife and Environment Society of South Africa (WESSA).

### Acknowledgements

Rufford Foundation.



## **Progress on Nesting Surveys in the Okavango Panhandle during the 2016 nesting season.**

The Phillipso channel in the Okavango Panhandle has been identified as a hotspot and sensitive crocodile nesting area. The Okavango Panhandle holds 99% of the all the crocodile nest sites in the whole Okavango Delta system. The continuous monitoring of the Phillipso is essential to understanding nesting trends, behaviour and success in the Panhandle.

### **Objective:**

To conducting a comprehensive crocodile nesting survey along the Phillipso channel in the Okavango Panhandle.

### **Methods:**

An aerial survey in October 2016 identified 19 crocodile nests in the Panhandle region of the Okavango Delta. The research team then carried out a ground truth survey in the Phillipso channel and nearby main channel, to confirm the presence of these nest sites. The ground exercise also aimed to find new sites from the boat and assess the success of the nests identified. The ground truth survey was carried out using a boat and travelling along the channel inspecting the banks for signs of crocodile nesting. The research team have over decade of experience with finding these nest sites and were able to confirm all of the nest sites identified from the air.

### **Results:**

Nesting numbers in the sensitive Phillipso channel remained stable over the nesting years of 2015 and 2016. A total of 11 nest sites were identified in both 2015 and 2016 and it is assumed that as many as 9 out of the 11 have been the same nesting females who returned to the same nest site in consecutive years. While nesting numbers remained stable, the impact of seasonal fires remains a concern for nesting female crocodiles. Seasonal fires burn from the months of September each year and this is directly over the nesting period for crocodiles and a host of bird species.



**Figure 1. Successfully hatched crocodile nest**



**Figure 2. A 2016 Crocodile hatchling found at a successfully hatched nest site.**



**Figure 3. Camera trap placed at a potential nesting site to identify adult female crocodiles**



Figure 4. Successful capture of photograph of adult crocodile using the infrared camera trap.

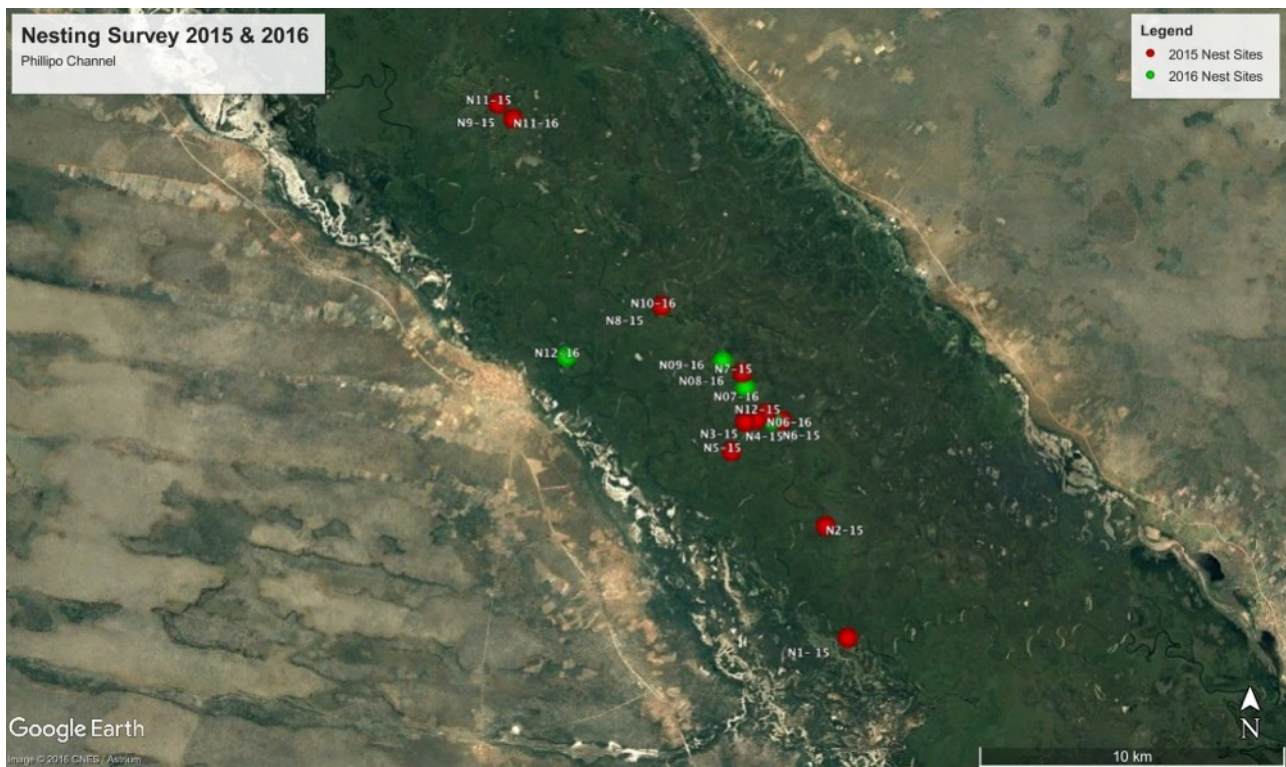


Figure 5. The 2015 nest sites indicated in RED and the 2016 nest sites indicated in GREEN. Results suggest that nesting over the 2015 and 2016 seasons remained stable.

## Progress on Environmental Education

Below is a copy of the Aquatic Food chain poster used for the presentation and delivered to the school for use during further lectures on the topic. The lecture included basic training for two independent community trainers who will continue with these lectures at the local primary schools along the Panhandle in 2017.

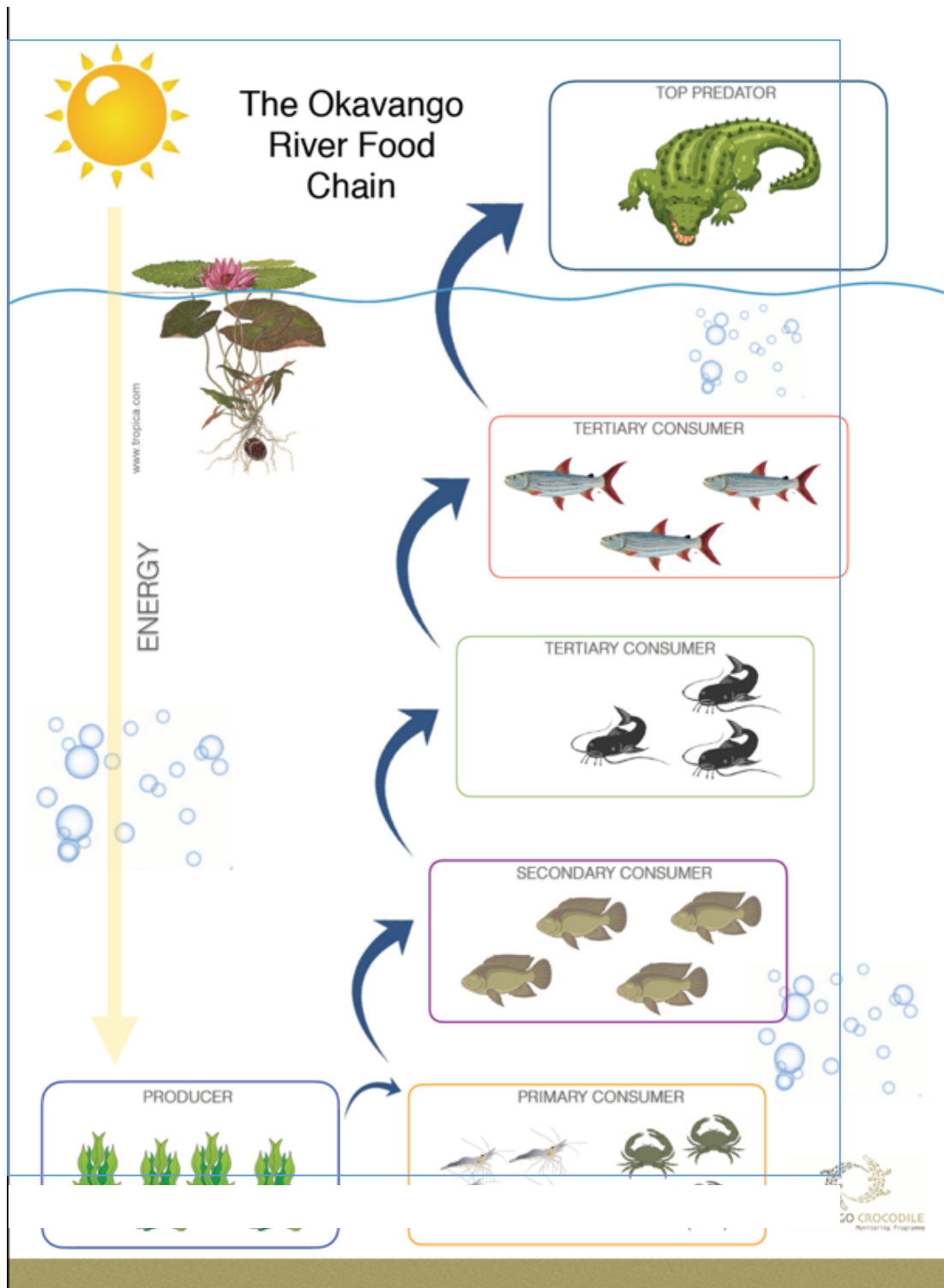


Figure 6. Aquatic food chain poster presented to schools



**Figure 7. The aquatic presentation to the pupils of Samochima Primary School.**



**Figure 8. Food chain lesson to one of the classes.**




Okavango Crocodile Monitoring Programme

**ACTIVITY TWO:**

**WHERE DOES OUR WATER SUPPLY COME FROM?**

This LANGUAGES activity introduces the concept of 'catchments' and that every single one of us lives within a catchment. It also looks at water sources and encourages learners to consider how we can protect and care for them.

Everyone lives in a catchment. A catchment is the area of land that collects the rain for one main river and all the streams and other rivers that flow into it. Each river has its own catchment and different catchments are separated by mountains or hills.



Water is essential for all of us. We drink it every day, we use it for cooking, washing, cleaning our bodies, watering plants and vegetables, flushing the toilet and many other things. It is essential for our good health and it is very important that we only drink water that is clean.

**Where does all the water we use come from?**

**Ground water.** When water falls to the Earth as rain, some of the water is slowed down by plants and grass and slowly sinks into the ground. It is cleaned as it passes through the soil and some of it may end up in an aquifer. An aquifer is a natural rock formation that acts as a sponge to store water underground. Groundwater can collect in huge underground lakes and some water has been in these lakes for many years. When the groundwater comes to the surface, it forms springs, wetlands or lakes. Did you know that most of the world's freshwater is actually underground!!

**Springs.** Groundwater sometimes bubbles to the surface as a spring. Springs provide us with clean water so we must make sure that they are protected and carefully looked after. Imagine how muddy and dirty the water would be if we let a herd of cattle trample over a spring!

**Wells.** If the underground water is close to the surface, it can be reached by digging a hole. This is often done in dry river beds. The water in the well can be brought to the surface using a bucket on a rope. People who collect water from wells must make sure the bucket and rope are clean otherwise they will dirty the rest of the underground water.

**Boreholes.** Sometimes groundwater is very deep or the ground is very hard and so the water can only be reached by using a machine and drilling a hole into the ground. These deep wells are called boreholes. Water is brought to the surface by a pump.

9 of 18 Grade 1: Lesson Plan

Okavango Crocodile Monitoring Programme

**Rainwater harvesting.** Where there is no groundwater, or if it is very dirty and not good to drink, collecting rainwater is another way we can get water. The rainwater can be collected off the roof of a house or school building by using gutters and tanks.

**Dams.** They store river water which can be used for crops, industries and our own homes.

**Rivers:** Rivers transport water from the high catchment areas to lower lying areas where most people live and farm.

After reading the information above to your class, ask the learners the following questions:

1. Do you know where the water you drink at home comes from?
2. How do people that live near you get their water?
3. Do you think the water that you drink is clean?
4. How do you know?
5. Do any of you live on a farm where you get your water from a river or borehole?
6. What does the water taste like?
7. How many of you have been swimming or sailing or even fishing on a big dam?
8. Did you know that many people will use that water for drinking?
9. Have you seen any rivers or streams or ponds that are very dirty?
10. What did you see?
11. Did you see many plants, animals or insects in the dirty river/stream/pond?
12. Have you seen any rivers or streams or ponds that are very clean?
13. What did you see?
14. Did you see any plants, animals and insects in the clean river/stream/pond?

In the previous lesson, the class explored ways in which water could be saved. It is also very important that the learners consider how to protect and care for the water sources that supply the very water they use each day.

15. What can we do to care for dams, rivers, ponds and streams when we go fishing or poling in our **Mekong**?

*Question 15 should encourage learners to think about how they enjoy many water sources, such as dams and rivers, and how they can make sure that their individual actions do not contribute towards polluting water sources (such as not leaving litter, both near a water source and in the water source, after a picnic or fishing tackle after a fishing expedition with the family).*

*Depending on your group, the discussion that may arise from Question 15 could lead the class into taking some environmental action such as a river or stream clean-up, or adopting a river and keeping it free of invasive, alien plants. Even if Question 15 does not lead to any class or group environmental*

10 of 18 Grade 1: Lesson Plan

Okavango Crocodile Monitoring Programme

action, it should leave the learners knowing that, as individuals, they CAN all make a difference and that their individual actions are very important in keeping our water sources clean.

Criteria to assess learners during this languages lesson

Criteria	Exceeded requirements of the Learning Outcome	Satisfied requirements of the Learning Outcome	Partially satisfied requirements of the Learning Outcome	Not satisfied requirements of the Learning Outcome
The learner listened to the questions and responded appropriately.				
The learner listened to the questions on water sources without interrupting the teacher.				
The learner was able to share his/her personal experiences of water sources.				
The learner was able to offer solutions and/or comments about their environmental actions when engaging his activities near or around a water source (question 15).				

11 of 18 Grade 1: Lesson Plan

Figure 9. An example of an activity presented in one of the lesson plans for Grade 1 pupils.