supervising scientist report **152**

The hydrobiology of Keta and Songor Lagoons

Implications for coastal wetland management in Ghana

CM Finlayson, C Gordon, Y Ntiamoa-Baidu, J Tumbulto & M Storrs

Environment Australia
Department of the Environment and Heritage

supervising scientist

This project was a collaborative effort between the Ghana Wildlife Department, the Ghana Wildlife Society and the Environmental Research Institute of the Supervising Scientist, Australia. It formed part of the Ghana Coastal Wetlands Management Project (CWMP) which was executed by the Ghana Wildlife Department.

The CWMP is a component of the Ghana Environmental Resource Management Project, it was funded by the Global Environmental Facility (GEF) with the World Bank as the Implementing Agency and coordinated in Ghana by the Environmental Protection Agency.

C Max Finlayson – Environmental Research Institute of the Supervising Scientist, Locked Bag 2, Jabiru NT 0886, Australia.

Christopher Gordon – Volta Basin Research Project, University of Ghana, PO Box 209, Legon, Accra, Ghana; Zoology Department, University of Ghana, PO Box 67, Legon, Accra, Ghana.

Yaa Ntiamoa-Baidu – Zoology Department, University of Ghana, PO Box 67, Legon, Accra, Ghana; Ghana Wildlife Society, PO Box 13252, Accra, Ghana.

Jacob Tumbulto – Water Research Institute, Council for Scientific and Industrial Research, PO Box M326, Accra, Ghana.

Michael Storrs – Environmental Research Institute of the Supervising Scientist, Locked Bag 2, Jabiru NT 0886, Australia; present address: Northern Land Council, PO Box 42921, Casuarina, NT 0811, Australia.

This report should be cited as follows:

Finlayson CM, Gordon C, Ntiamoa-Baidu Y, Tumbulto J & Storrs M 2000. *The hydrobiology of Keta and Songor lagoons: Implications for coastal wetland management in Ghana*. Supervising Scientist Report 152, Supervising Scientist, Darwin.

The Supervising Scientist is part of Environment Australia, the environmental program of the Commonwealth Department of Environment and Heritage.

Supervising Scientist
Environment Australia
GPO Box 461, Darwin NT 0801 Australia

ISSN 1325-1554

ISBN 0 642 24355 7

Printed in Darwin by NTUniprint.

Contents

Figures

Tables

Executive summary

Keta and Songor lagoons are located alongside the current delta of the Volta River in eastern Ghana. The lagoons and surrounding wetlands are heavily utilised by a large population of people who fish using a variety of techniques, cut reeds for thatch and weaving, harvest salt by intensive and extensive means, and irrigate vegetables using water drawn from shallow wells in the surrounding sandy soil. The lagoons are also important habitat for many aquatic and wetland animals and species and have been recognised as internationally important under the Ramsar Wetlands Convention. However, increasing exploitation of the lagoons and their resources has resulted in degradation and raised concerns about the long-term sustainability of these systems. These concerns are being addressed through the Ghana Coastal Wetlands Management Programme (CWMP), which was implemented by the Ghana Wildlife Department as part of the Ghana Environmental Resource Management Project and funded by the Global Environment Facility. The general aim of the CWMP is to manage five coastal wetland sites to maintain their ecological integrity and enhance the benefits derived from the wetlands by local communities.

In line with the general aim of this program a broadscale baseline description of the ecological character of Keta and Songor lagoons was undertaken. As ornithological and fish surveys were undertaken in separate exercises they were not included in this study. Our surveys covered:

- meteorology;
- bathymetry and hydrology (surface and groundwater and water uses);
- sedimentology (particle size, organic content);
- water quality (field analyses for pH, dissolved oxygen and conductivity; laboratory analyses for major ions, nutrients and metals);
- aquatic fauna (diversity and abundance of benthos and zooplankton);
- aquatic/wetland phytoplankton (species diversity and chlorophyll);
- macrophyte diversity, biomass and phenology.

Most of the field surveys were undertaken in November 1996 with subsequent supplementary surveys and analyses of the samples and data taken over ensuing months. The surveys were based on a systematic sampling grid placed across each of the lagoons and adjoining wetlands as a template for determining spatial patterns. As Keta is much larger than Songor, the sampling effort was also much larger and included large areas of surrounding wetland as well as the open water. Temporal patterns were not determined; however, this important aspect was addressed in recommendations for further monitoring and management.

The data and information collected through these surveys were used with information gathered from other sources to provide comment on the major threats to the lagoons under the general headings of ‘water regime’, ‘water pollution’, ‘physical modification’ and ‘exploitation and production’. Recommendations for monitoring and research were also made.

In assessing further monitoring needs, we recognised that as the lagoons are very large it would be impossible to carry out the same sort of sampling intensity that was used in this baseline study. Thus a stratified random approach was recommended as the basis of a simple bimonthly monitoring strategy for selected hydrology, water quality and biological parameters at 6 sites in Songor and 17 sites in Keta.

A list of further research projects was compiled with an emphasis being placed on environmental issues and management of the lagoons, including:

- re-colonisation by invertebrate fauna;
- environmental tolerance of invertebrate fauna;
- ecology of Penaeids;
- zooplankton dynamics within the main channels of the wetlands;
- development of invertebrate fauna within acadjas;
- determination of the factors controlling the spread of various mollusc species in the wetlands;
- decomposition of aquatic plants;
- resource partitioning between crabs in the lagoons;
- harvesting and usage of aquatic macrophytes by local communities;
- groundwater salinity and mangroves;
- hydrogen sulphide in sediments and its effect on the vegetation in the lagoons.

In order to assist with further monitoring and analyses of results we also included in this report detailed descriptions of the field sampling methods and data collected during the baseline surveys.