GEOLOGICAL CONTRIBUTION TO ENVIRONMENTAL MANAGEMENT OF COASTAL LAGOONS AT GOSFORD, NEW SOUTH WALES (AUSTRALIA)

CONTRIBUTION GÉOLOGIQUE A LA DÉFENSE DE L’ENVIRONNEMENT DES LAGUNES COTIÈRES A GOSFORD, NOUVELLE-GALLES DU SUD (AUSTRALIE)

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Summary:

The study, carried out during 1974 and 1975, of four enclosed coastal lagoons was aimed at developing an environmental management plan for the long-term preservation of the water quality in a heavily tourist-oriented area.

Bottom sediments were analysed, four main populations identified and their distribution evaluated revealing areas of accelerated soil erosion. Benthonic foraminifers were also considered to recognize water qualities and physico-chemical conditions within the lagoons.

Tidal studies in the lagoons showed that there is no tidal influence from the sea except when the lagoons’ entrances are open.

The study revealed that while the lagoons were under stress from urban and agricultural development of the catchments, there was no permanent pollution problem.

Evidence of accelerated erosion through development of steep slopes suggested that management of development was necessary. In particular retention or expansion of natural vegetation especially around the lake shores is an essential management procedure to maintain sediment quality and remove part of the pollutants and nutrients before entering the lagoons.

Résumé:

L’étude de quatre lagunes côtières entourées, fut effectuée pendant les années 1974 et 1975 et avait pour but le développement d’un plan à long terme pour la préservation de la qualité de l’eau dans un centre touristique très fréquenté.


De l’étude des marées dans les lagunes il en ressort que l’influence des marées de la mer est negative excepté que l’accès a celles-ci est ouvert.

Cette étude démontre qu’alors les lagunes étaient sous pression par rapport au développement des bassins de la ville et de l’agriculture, il n’y avait aucun problème permanent de pollution.

L’vidence de l'érosion accélérée due au développement de pentes escarpées suggérait la nécessité de contrôler le développement. Il n’y a pas de doute que la conservation ou l’expansion de la vegetation naturelle autour du lac est essentielle pour maintenir la qualité du sédiment et enlever une partie des produits de la pollution et de la nutrition avant de leur entrée dans les lagunes.

Background

In 1974, the New South Wales Department of Health sampled the water of three coastal lagoons at Gosford, 80 km north of Sydney. (Fig. 1). Their findings indicated that the water was polluted by faecal coliform bacteria, and the Gosford Shire Council was requested to close the lagoons to swimming. This occurred just prior to the commencement of the 1974-5 summer holiday season, when thousands of families occupy holiday accommodation and each day thousands of visitors from Sydney and adjacent areas stream into the Gosford region to enjoy its surfing and lagoon beaches, its rural atmosphere, and its magnificent coastal scenery.

Evidence of accelerated erosion through development of steep slopes suggested that management of development was necessary. In particular retention or expansion of natural vegetation especially around the lake shores is an essential management procedure to maintain sediment quality and remove part of the pollutants and nutrients before entering the lagoons.

Environmental management plan to maintain the quality of the water and ensure protection of public health in the future.

Four lagoons were selected for study — Terrigal, Wambera, Avoca and Cockrone. Initial investigations showed that nothing was known about the lagoons, not even their water depth or whether their beds were above or below sea level. No chemical or biological data whatsoever was available, and virtually nothing was available on the characteristics of their catchments. A full environmental study was undertaken over 12 months which included the following:

- water sampling at 12 sites each week for pH, temperature, dissolved oxygen, salinity, F. coli. and turbidity (Secchi disc).
- sampling at the same twelve sites each month for suspended solids, heavy metals (Ca, Pb, Cu, Zn, Hg), nitrate, organic nitrogen, phosphate, chloride and detergents (methylene blue active substances).
- sampling of sediments at 36 sites for grain-size analysis and for sediment chemical content (Pb, As, Cu, Ni, pO).
- measurement of bottom contours of four lagoons.
- continuous tidal recording of four lagoons.
- geological mapping of four catchments.

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