1. INTRODUCTION

1.1 PROGRAM OVERVIEW

In 1992 the Great Barrier Reef Marine Park Authority (GBRMPA) initiated a water quality monitoring program for the Great Barrier Reef – the Great Barrier Reef Nutrient Status Monitoring Network. The broad objectives of the Network are to document the nutrient status of regional waters within the Great Barrier Reef (GBR) lagoon, and in the long-term, identify any significant trends which may result from adjacent land-use patterns. Chlorophyll *a* concentration was chosen as a proxy nutrient bioindicator because it integrates change in nutrient availability through time and is comparatively inexpensive and simple to collect. It was recognised that several years of data would need to be gathered before any long-term trends could be reliably distinguished. The Network was conceived to ideally expand as resources became available, and priority coastal areas are identified. It was to complement and collaborate with a number of other existing monitoring programs to ensure comprehensive status reporting of the GBR.

The Network initially commenced with five clusters: Lizard Island (14°S), Port Douglas (15°S), Cairns (16°S), Keppel Bay and Capricorn (23°S). Additional clusters of stations commenced off Townsville (18°S) in 1995, and off the Whitsundays (21°S) and in the Far Northern Section (13°S) in 1996. The choice of stations was primarily dictated by the availability of personnel who could be contracted to undertake routine, long-term sampling in a reliable cost-effective manner. Within each cluster, between five and eight fixed sampling stations are sampled at approximately monthly intervals. Table 1.1 summarises the overall design of the program.

Table 1.1 Summary of the Great Barrier Reef Nutrient Status Monitoring Network objectives and framework

Management Goal:	Status and trend detection of changes in nutrient status of Great Barrier Reef lagoon waters
Objectives:	To quantify regional and cross-shelf patterns of phytoplankton biomass (as chlorophyll *a*) and relate these to nutrient input and availability; and to examine temporal variability in phytoplankton biomass which may reflect changing episodic nutrient inputs to Great Barrier Reef shelf waters.
Environmental context:	Regionally and temporally heterogenous water mass affected by a variety of nutrient inputs and changing land-use patterns
Nutrient Indicator:	Chlorophyll *a* as an integrator of nutrient inputs and availability
Spatial scale:	Regional network. Initially, five latitudinal clusters (14–23°S) with a total of 41 fixed sampling stations
Temporal scale:	Monthly, ongoing
Participants:	Great Barrier Reef Marine Park Authority, Australian Institute of Marine Science, Queensland Department of Environment and Heritage, Lizard Island and Heron Island Research Stations, Reef Biosearch Pty Ltd

1.2 REPORT SCOPE

As this is the first report of the Network, its purpose is twofold: (1) to detail the existing monitoring program design, and (2) to summarise the results for the first three and one-half years of sampling (1993–1996). Accordingly, the report is presented in two parts. In Part 1, the logic and design of the Network are detailed. Sampling protocols, data handling and interpretation are documented. Part 2 describes the hydrographic conditions and chlorophyll *a* concentrations from 1993 to 1996 in the Lizard Island, Port Douglas, Cairns, Townsville, Keppel Bay and Capricorn clusters. Spatial and temporal trends in chlorophyll *a* concentration are summarised. The analysis is necessarily descriptive, and does not attempt to infer nutrient status of the GBR. These results do, however, provide a basis for consideration of the efficacy of the current experimental design.