



**הניטור הלאומי במפרץ אילת**  
**Israel National Monitoring of the Gulf of Eilat**

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**Abstract of the First Interim Report:  
Fall 2002-Spring 2003**

by

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# **ISRAEL NATIONAL MONITORING PROGRAM IN THE NORTHERN GULF OF EILAT**

## **Abstract of the 1<sup>st</sup> Interim Report (Fall 2002-Spring 2003)**

Following is a brief account of the objectives, activities, findings and interpretations of the results of the National Monitoring Program (NMP) in the Gulf of Eilat (northwest section of the Gulf of Aqaba) in the first half year since its initiation. Although this program commenced in September 2002, the Ministry of the Environment requested the presentation and interpretation of the NMP results together with the results of previous programs that had been conducted in the Gulf of Eilat in recent years. Foremost among these are the Red-Sea Program (RSP, 1996-1999) and Red-Sea Marine Peace Park Program (RSMPP, 1999-2002). Much of the credit for this report, therefore, is also due to these programs (see Interuniversity Institute for Marine Sciences of Eilat [www.iui-eilat.ac.il](http://www.iui-eilat.ac.il)).

### **Mission Statement and Program Objectives**

The main mission of this program is to gather and create a set of long-term data on the condition of the marine ecological system of the Gulf of Eilat. This set of data will form the scientific basis upon which natural resource management authorities will be able to make operational decisions, which may have an effect on this environment. In order to fulfill this mission, the following objectives should be realized:

1. Develop and operate an array of modern continuous measuring systems of the key ecological parameters in the major habitats.
2. Observe and test the occurrence and intensity of trends in the environment by following basic and sensitive parameters.
3. Assess the “health” status of the ecosystem.
4. Report on the status of the ecosystem and alert management in case of impending danger to the system.
5. Develop and propose strategies for stopping deterioration and for restoring the ecosystem.
6. Initiate, direct and fund scientific studies in order to investigate anomalous findings.

### **Main Findings for the Period September 2002 – May 2003**

1. The winter of 2002-03 was relatively mild in comparison to the previous winters (2000-2002). This resulted in a relatively shallow vertical mixing associated with the surface cooling, and the mixed layer reached a maximal depth of 350 m. However, there were no significant deviations from the 15-year records of sea surface temperature and phytoplankton biomass.
2. A survey of the reef community indicated that there was no significant change in surface live cover and different substrates. However it should be noted that although no further deterioration occurred in the past three years, the reef's live cover and species diversity has decreased by tens of percent since the 70's and



80's in comparison to the findings of Prof. Yossi Loya and his group from Tel Aviv University at the same sites.

3. The rate of community deposition of  $\text{CaCO}_3$  in the reef during the winter was characteristically low with respect to the past three years. These rates were very low compared with those published for coral reefs in the Indo-Pacific and with earlier measurements at the same reef and at other reefs in the Gulf of Aqaba.
4. The potential growth of benthic algae in the reef rose dramatically in 2001 and has stayed relatively high ever since. This change is indicative of nutrient subsidy from an external source. However, increased grazing rates have managed to suppress the realized algal growth and have prevented the domination of the benthic community by autotrophs (fleshy, filamentous algae).
5. The percentage of organic matter in the sediment increases along the coastal shallows from Taba in the south towards the North Beach area of the Gulf. The organic content is above 2%, which was previously observed only in the North Beach sediments. This gradient may be affected by the varying character of the sediments along the coast, such as grain size and carbonate content. An increase in organic matter percentages in the sediment between 1999 and 2003 may be indicative of a regional scale organic loading, as corroborated by the aforementioned increase in the growth of benthic algae and other observations (see below).
6. There has been a decrease in pH values in the coastal and open-sea surface water during the stratified season of the past 4 years. The pH has decreased since 1997 by 0.06 pH units, which is an order of magnitude different than the measurement precision. This parameter is also an indication of increased external organic matter loading in this part of the Gulf.
7. Primary productivity rates in the past two years are significantly higher than those measured during the 70's and 90's. During the winter of 2000-01 productivity rates were particularly high. This trend is most likely the result of the ever-increasing nutrient inventory in the Gulf.
8. The total oxidized nitrogen inventory in the open water column has risen steadily over the past 6 years (since 1997) and is now (June 2003) greater by a factor of 2 relative to June 1997. This process was documented by combining data of the NMP with data gathered by Erez and Lazar as part of the IET program.
9. The fact that 5 totally independent measurements have indicated declining water quality trends (increased total oxidized nitrogen inventory, increased primary productivity, decreased pH, increased percentages of organic matter in the sediments and increased macro-algae growth potential) supports the conclusion that there is a large scale ongoing eutrophication process in the Northern Gulf of Eilat. High-resolution spatial measurements indicate that the source of enrichment is in the North Beach region and that it is affecting the Western Shore where the coral reefs are situated and the open water of the Gulf. Many studies around the world have shown that eutrophication in coral reefs has a negative and often mortal impact on the exposed reef.
10. In light of these findings, it is suggested that a professional meeting should be urgently convened to discuss and formulate practical measures to reduce the organic load in the Northern Gulf of Eilat.