

# SUEZ CANAL EXPANSION PROJECT BETWEEN GLOBALIZATION NECESSITY AND ENVIRONMENTAL IMPLICATIONS

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## Abstract

Since the inauguration of the Suez Canal Expansion project an agitated sea of newsletters and articles hit the project with assumptions. The main potential impacts alleged was the dramatic increase in the introduced number of alien species. Water hydrodynamic study by RMA-II model indicated that changes in the water volume, current speed and directions may have insignificant impacts on increasing the potential number of migrated species. This mainly was attributed to restriction of expansion works to the middle sector and preserving the canal inlet and outlet without any alterations or deepening. Mitigation measures were identified and evaluated to be implemented. Environmental Monitoring program is currently in place for early warning of potential migrant species, risk assessment and control/eradication of invasive species.

*Keywords: Alien species, Suez Canal*

## Introduction

The Suez Canal is directly linking the Mediterranean Sea to the Red Sea. It is the longest canal without a lock in the world. Opened for shipping in 1869, it abridged the distance between the Eastern and the Western parts of the world. With the increase of globalization in term of international trade, the Suez Canal went through many development stages to increase its size in order to accommodate larger vessels. The Suez Canal expansion project created a new bypass in two areas of the existing canals with total length of 35 km and dredged and expanded the existing pass (at Bitter Lakes) with a total length of 37km (Figure 1). The project aims to increase the navigational capacity and to improve the shipping traffic by eliminating the convoy system and to achieve the non-stop direct crossing for 45 ships in both directions, as well as reducing the crossing and transit time to a maximum of 3 hours instead of 8 to 11 hours. Species migration is a global phenomenon took place all over the world, the drivers behind migration process are often of global nature despite the impacts being observed on local scale. For instance, San Francisco Bay receives a new aquatic species every 14 week (Before 1960, the rate was approximately once every 55 weeks.) This acceleration is likely because of a rise in propagules pressure as a result of increased shipping traffic and aquaculture activities. Humans have also changed aquatic system through eutrophication (the increase of nutrients such as nitrogen and phosphorus), the removal of top predators, and other modifications including Global warming. Rising sea temperature, in response to increased atmospheric carbon dioxide, causes a shift in the geographical distribution of marine species. Increasing temperature in the Mediterranean Sea may result in more favorable conditions for the majority of migrant organisms with Indo pacific origin. This species thrive at relatively high temperature thus will likely favor their reproduction, growth and survival at elevated temperature (1). During 1955 sea temperature rose in the Mediterranean by 1.0 to 1.5 °C in the winter months allowing species such as *Saurida undosquamis*, *Sargocentron rubrum* and *Upeneus moluccensis* to establish population in the Mediterranean as the higher temperature favored their reproduction compared to the native species. The Mediterranean Sea acidification in a changing climate project, 2014 indicate that changes in the CO<sub>2</sub> concentration of the Mediterranean could indirectly result in vacant niches which increase vulnerability of being colonized by invasive predators.

## Results and Discussion

The Mediterranean support an ever growing suit of migrating alien species, not only driven through Suez canal but from various vectors, of them ( Atlantic-Mediterranean route; Shipping including fouling organisms and ballast water; Aquaculture and marine curio-trade; as well as global warming phenomena). The migration through the Suez Canal depends on many factors of them, the removal of the salinity barrier of the bitter lake, the elevation of salinity in the eastern Mediterranean as a result of reduction of fresh water inflow from the High dam. As mandatory requested by Environment Law 4 in 1994 amended by Law 9 in 2009 and its Executive Regulations Suez Canal Authority (SCA) submitted a preliminary EIA study of the project on the 29<sup>th</sup> of July 2014. The Egyptian Environmental Affair Agency (EEAA) studied the submitted document and approved in principle, with an emphasis on the need to prepare a strategic environmental

assessment study. In June 2015 the final EIA study was submitted for revision and appraisal. The EIA elaborated the proposed impacts to be on changing the hydrodynamic system of the Suez Canal, increasing of turbidity levels and the movement of tracer materials. The tidal level will change slightly in the central part of Suez Canal with maximum increase of 10 cm while the tidal current will decrease in the central and northern parts at (Deversoir and Ferdan). Moreover the change in discharge flow rate to the Mediterranean is nearly zero. Turbidity was within the permissible level which is less than 60 mg/L except in the area that extends about 1 km north and 1 km south of a spot where dredging occurs. Simulation models of the movement of a tracer from Bitter Lakes to Timsah showed that the new expansion has minor effects on the spread of the tracer material. Feasible mitigation measures were studied and ranked, on top of the list came the salinity barrier (higher or lower than ambient salinity) in combination with other solutions like bubble curtain to deter migration of different planktonic stages. These options raised the need for mesocosm studies to adopt the most suitable solution. Studying the effectiveness of mitigation measures applied on the expansion project will doubtless expand our understanding to apply the proper measure for the entire Suez Canal to control and eliminate the threat of invasive species (2). The study suggested multiple vectors mangment approach to manage (ballast water, ship hull fouling and restoration of the natural salinity barrier. The expansion project give us a unique opportunity to study the settlement and succession that took place 150 years ago in Suez Canal. Moreover studies will reveal species traits, time lag in species introduction, settlement and adaptation, as well as the risk assessment of exotic species(3).

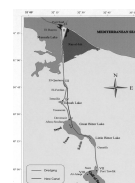


Fig. 1. Suez canal Map showing location of extension project

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