Red Sea – Dead Sea Water Conveyance Study Program

Overview – Updated January 2013

Background

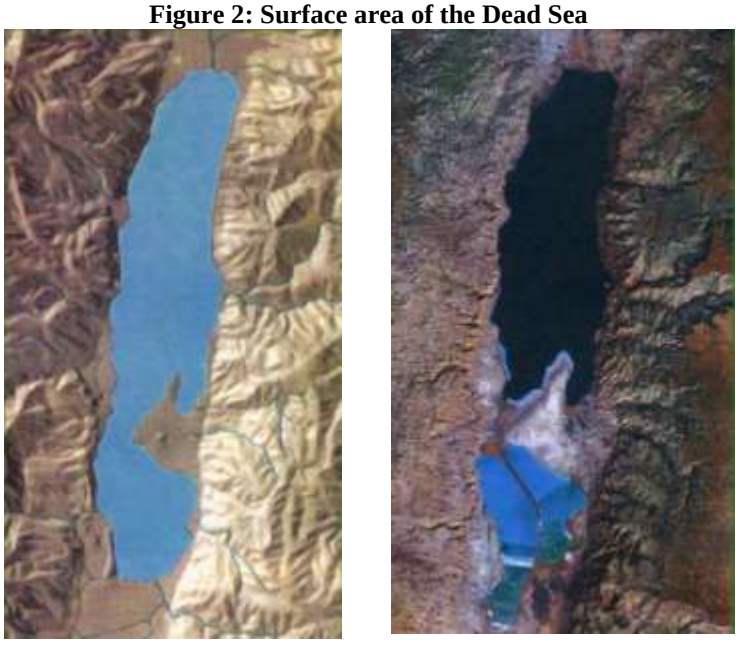
The Dead Sea (see Figure 1) has been a centerpiece in the history of many cultures and religions for centuries. The region around the Dead Sea is considered by some as the cradle of human culture and civilization. It features numerous archeological and historic sites. The Dead Sea is considered the lowest spot on earth – about 400 meters below sea level. Its water is ten times more saline than ocean water, making it one of the saltiest water bodies in the world. The Dead Sea's distinctive chemical composition and fresh/salt water interface have created a unique ecology of international importance.

Figure 1: Satellite image of the Dead Sea and surrounding areas

In recent years, tourism and recreation have made a major contribution to the economy of the region. The Dead Sea and its shoreline support a significant health industry. Additionally, potash mining and processing (and related chemicals) are major industries on both sides of the Sea.

The Dead Sea and its unique environment are changing, as the water level is dropping due to a sharp decrease in inflow. The water level has fallen from 394 meters below sea level in the 1960s to about 423 meters below sea level as of end 2012. As a result, the Sea's water surface area has been reduced by one third: from roughly 950 square kilometers to 637 square kilometers today (see Figure 2). The water level continues to drop at an alarming pace of 0.8 to 1.2 meters per year, and the Sea's surface area is shrinking accordingly.

Figure 2: Surface area of the Dead Sea



1960 **2005**

The significant decline of the water level over the past 30 years is due to diversion of water from the Jordan River and from the Dead Sea itself. The Jordan River is the main water body feeding the Dead Sea. Water extracted from the river is of vital importance for the population and economy in the region.

Environmental damage has already been incurred in the Dead Sea area. Current damage includes loss of freshwater springs, river bed erosion, and occurrence of over one thousand sinkholes. If no action is taken to remedy the situation, the further decline of the Sea is likely to cause more severe environmental,

cultural, and economic damage. It is estimated that, if left unattended, the Dead Sea will reach a new equilibrium at an elevation that is about 100 meters below the current level.

The region and the international community view the Dead Sea as a site of cardinal international cultural, environmental, and tourism importance. There is much – local, regional, and international - interest to "Save the Dead Sea". For example, the NGO community has proposed designation of the Dead Sea as a World Heritage site.

The Red Sea – Dead Sea Water Conveyance Concept

The need to save the unique values of the Dead Sea, the desire to avoid an environmental calamity, and the need to develop additional water resources have led Jordan and Israel to promote the rehabilitation of the Dead Sea. As part of peace negotiations, they conceived the concept of water conveyance from the Red Sea to the Dead Sea as a means to arrest the declining water level and to allow gradual refilling over time to a feasible level. The concept was also agreed to by the Palestinian Authority.

The three Beneficiary Parties (in alphabetical order: the Government of Israel, the Government of Jordan and the Palestinian Authority) have articulated a shared vision of the Red Sea–Dead Sea Water Conveyance Concept, centered on:

- Saving the Dead Sea from environmental degradation;
- Desalinating water and generating energy at affordable prices for Jordan, Israel, and the Palestinian Authority; and
- Building a symbol of peace and cooperation in the Middle East.

Connecting the two seas is not a new idea. A possible inter-basin transfer has been studied in many forms since the mid-1800s. The more than 400-meter difference in elevation between the Dead Sea and the Red Sea (or the Mediterranean Sea) has long been enticing because of the gravity flow advantage and the considerable potential for hydropower generation. As unit prices for desalination have dropped in recent years, combining the transfer with desalination for domestic uses has become more appealing.

The presently considered concept places rehabilitation of the Dead Sea as its top priority. It proposes a 180 kilometer long alignment from the Red Sea at Aqaba/Eilat to the Dead Sea that generally follows the border between Jordan and Israel and lies entirely in Jordanian territory. A 1998 pre-feasibility study (financed by the Italian Government and managed by the World Bank) considered fourteen alternatives for alignments and conveyance elevation. The study defined one preferred alignment along Wadi Arabah/Arava to be further investigated. The concept today considers an eventual annual water transfer of 2,000 million cubic meters from the Red Sea to the Dead Sea. This majority of this amount will be used for hydropower generation for pumping and/or energizing desalination plants. Over time a growing amount of this sea water would be used for desalination. At the same time Red Sea water, and/or the brine from desalination, would be used to stabilize the level of the Dead Sea.

The magnitude of the conveyance concept is not unprecedented. In order to put it in perspective, it is helpful to mention some major inter-basin water transfer projects elsewhere in the world. Examples of similar projects include: the Lesotho Highland Project in Lesotho and South Africa; San Francisco River Water Transfer in Brazil; Central Arizona Project in the USA; the Wanjiazhai Water Transfer Project in China; and the proposed Ebro River Water Transfer in Spain. These projects transfer similar volumes of water from one basin to another as the Red Sea – Dead Sea conveyance concept, and cost in the same range.

Role of the World Bank, Study Program Cost, Governance and Consultation

In a jointly signed letter to the World Bank dated 09 May 2005, the Beneficiary Parties requested the World Bank to coordinate donor financing and manage the implementation of the Study Program (see Figure 3). The Beneficiary Parties jointly and publicly announced their agreement at the World Economic Forum at the Dead Sea, in May 2005.

Figure 3.

The World Bank agreed to the request, as this role is relevant to development objectives of the World Bank. The World Bank also has a comparative advantage as an independent, trusted facilitator and brings the knowledge and credibility of a global organization, together with on-the-ground experience.

Originally, the work on the Study Program including the Feasibility Study and the Environment and Social Assessment was estimated to take about two years to complete and should be finalized by June 2010. Additional studies initiated during the course of the Study Program implementation include an independent Study of Alternatives, a Red Sea Modeling Study and a Dead Sea Modeling Study. According to the latest schedule, the Study Program will be completed by June 2013.

The total cost of the Study Program (including the report consultants, Panel of Experts, the stakeholder consultations and the implementation costs) is estimated at about US$16 million. The cost reflects the complex environmental, social, economic, and technical issues and concerns to be addressed. The World Bank has established a multi-donor trust fund to finance the Study Program and, as of 2010, eight bilateral donors have fully funded the Study Program. The donors are: France, Greece, Italy, Japan, South Korea, The Netherlands, Sweden and the United States of America.

Activities of the Study Program are being overseen by a Technical Steering Committee, consisting of four representatives of each of the Beneficiary Parties and two World Bank representatives.

Given the complexity of the Study Program and the proposed conveyance concept, an agreement was reached between the Beneficiary Parties to appoint an independent panel of experts of international stature to provide advice during the Study Program. The ten member Panel of Experts was appointed in September 2009.

Terms of reference for the Study Program stipulate that all reports will be comprehensive and transparent. This includes extensive public consultation, as well as stakeholder meetings and disclosure at every stage of the process. An important part of this disclosure process is the Study Program website: www.worldbank.org/rds, which contains many important documents, terms of reference, consultant reports and many background documents.

Study Program Contacts

Dr. Alexander McPhail
Task Team Leader
The World Bank
Washington, DC USA
Phone: +1 202 458-2125
E-mail: amcphail@worldbank.org

Dr. Stephen Lintner
Senior Advisor
The World Bank
Washington, DC USA
Phone: +1 202 453-2508
E-mail: slintner@worldbank.org