

Red Sea – Dead Sea Water Conveyance Study Program

Background Note – December 2009

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.

Until recently, tourism and recreation 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.

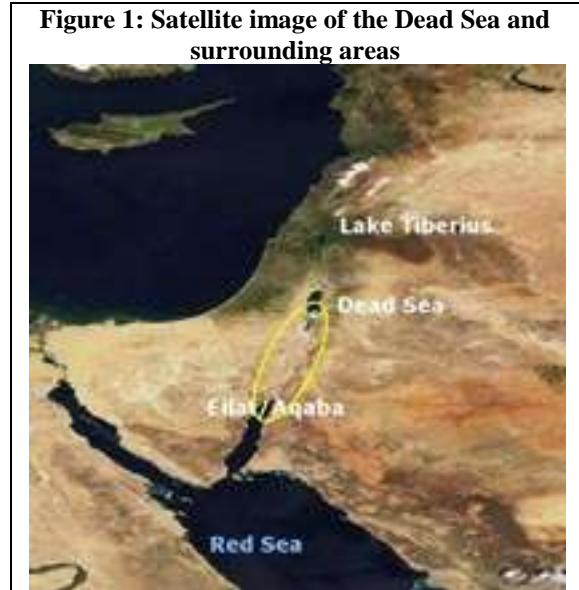


Figure 1: Satellite image of the Dead Sea and surrounding areas

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 420 meters below sea level as of mid-2007. As a result, the Sea's water surface area has been reduced by

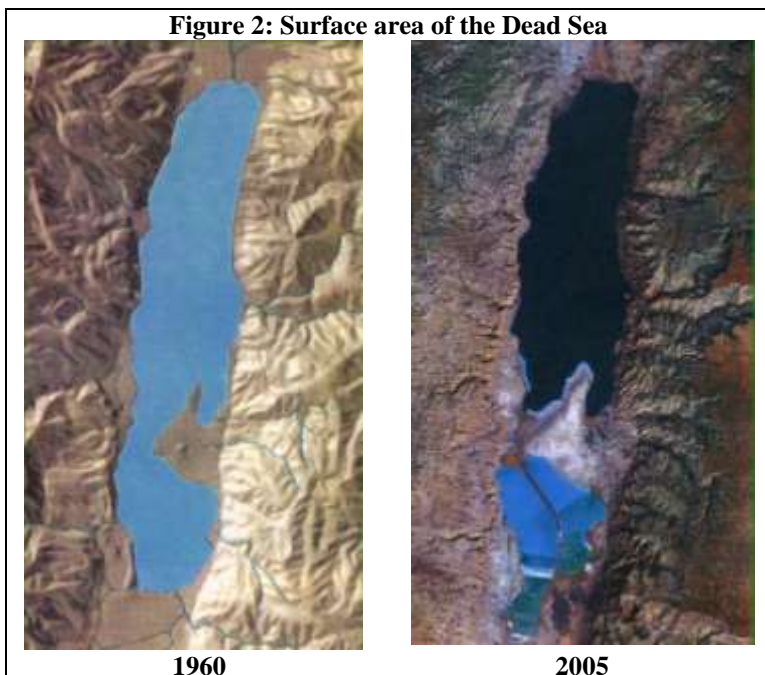


Figure 2: Surface area of the Dead Sea

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 meter per year, and the Sea's surface area is shrinking accordingly.

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”. This includes a grass roots movement, launched by Jordanian, Israeli and Palestinian Nongovernmental Organizations. The NGO community is proposing designation of the Dead Sea as a World Heritage site. This UNESCO sponsored designation would place the Dead Sea among the world’s important landmarks. The Friends of the Earth – Middle East is leading the initiative and UNESCO has undertaken initial reviews. A formal request to UNESCO must come from the Governments involved.

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 Palestinians.

The Government of Israel, the Government of Jordan and the Palestinian Authority (the Beneficiary Parties) 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 Palestinians; 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 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 or agricultural 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 Arava to be further investigated. The concept considers an eventual annual water transfer of 1,900 million cubic meters from the Red Sea to the Dead Sea. Initially, this entire amount would flow into the Dead Sea to raise the water level and thereby compensate for the inflow reduction due to lower Jordan River diversion and industrial and natural evaporation losses. This could be combined with hydropower generation for potential sale in the region and/or energizing a potential desalination plant. Over time, part of the conveyed water could be desalinated for potable water distribution to municipalities in the region.

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 Wanjiashai 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.

The Feasibility Study and the Environmental and Social Assessment

Terms of reference for the Study Program stipulate that a Feasibility Study and an Environmental and Social Assessment will be comprehensive and transparent, and will involve extensive stakeholder participation and disclosure.

The Feasibility Study will review and assess the technical, economic, financial, environmental, and social dimensions of the proposed water conveyance concept in an integrated manner. This Study calls for identification and evaluation of relevant technical aspects of the concept, including review of alternative sites for project components and a preliminary layout for these investments. The Feasibility Study shall not in any way prejudice the riparian rights of any of the Beneficiary Parties.

The Environmental and Social Assessment will review and assess the potential environmental and social impacts of the proposed conveyance concept. It will be carried out independently of the Feasibility Study by a separate consulting company. An element of the Environmental and Social Assessment is an analysis of alternatives at the regional level, which will be undertaken by a specialized study team.

The terms of reference for the Study Program include extensive public comment and consultation, as well as stakeholder meetings and disclosure at every stage of the process.

The Study Program Process and the Role of the World Bank

In a jointly signed letter to the World Bank dated May 9, 2005, the Beneficiary Parties requested the World Bank to coordinate donor financing and manage the implementation of the Study Program. The Beneficiary Parties jointly and publicly announced their agreement at the World Economic Forum – Dead Sea in May 2005 (see Figure 3).

In response to the request, the World Bank agreed to coordinate donor financing and manage the Study Program. The concept is relevant to development objectives of the World Bank, which 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 identified during the course of the Study Program implementation include: a Red Sea Modeling Study, a Dead Sea Modeling Study and a Study of Alternatives. According to the revised schedule, the Study Program will be completed by end

Figure 3: May 2005 World Economic Forum – Dead Sea



June 2011. The total cost of the Study Program (including the Panel of Experts, the stakeholder consultations and the implementation costs) is estimated at US\$16.7 million. The cost reflects the complex environmental, social, economic, and technical issues and concerns to be addressed.

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

Present Status

The World Bank has set up a multi-donor trust fund as a vehicle to finance the Study Program. A donor meeting was held in Paris in July 2005 to raise financing. As of December 2009, eight bilateral donors have made firm commitments to financing the Study Program: France, Greece, Italy, Japan, South Korea, The Netherlands, Sweden and the United States of America. At present, the multi-donor Trust amounts to US\$16.7 million.

The Feasibility Study and the Environmental and Social Assessment were awarded in April 2008 to two independent consulting firms. The Red Sea Modeling Study and Dead Sea Modeling Study will be awarded shortly to two different consulting firms. A Study Team conformed by three individual consultants supported by three Senior Level Researchers was appointed in October 2009 to carry out the Study of Alternatives.

An interdisciplinary nine-member panel of internationally recognized experts was appointed in September 2009 to serve as an independent reviewer of the Feasibility Study, the Environmental and Social Assessment, the Red Sea Modeling Study, the Dead Sea Modeling Study and the Study of Alternatives. This Panel of Experts toured the region in October 2009.

As indicated above, according to the revised schedule, the overall Study Program will be completed by end June 2011.

For the latest on the Red Sea – Dead Sea Water Conveyance Study Program, visit the website:
www.worldbank.org/rds.

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