

Red Sea – Dead Sea Water Conveyance Study Program

Background Note – October 2010

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.

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.

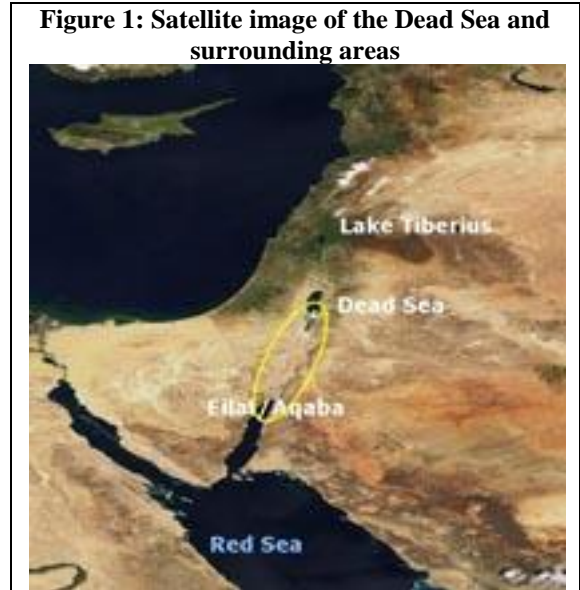


Figure 1: Satellite image of the Dead Sea and surrounding areas

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

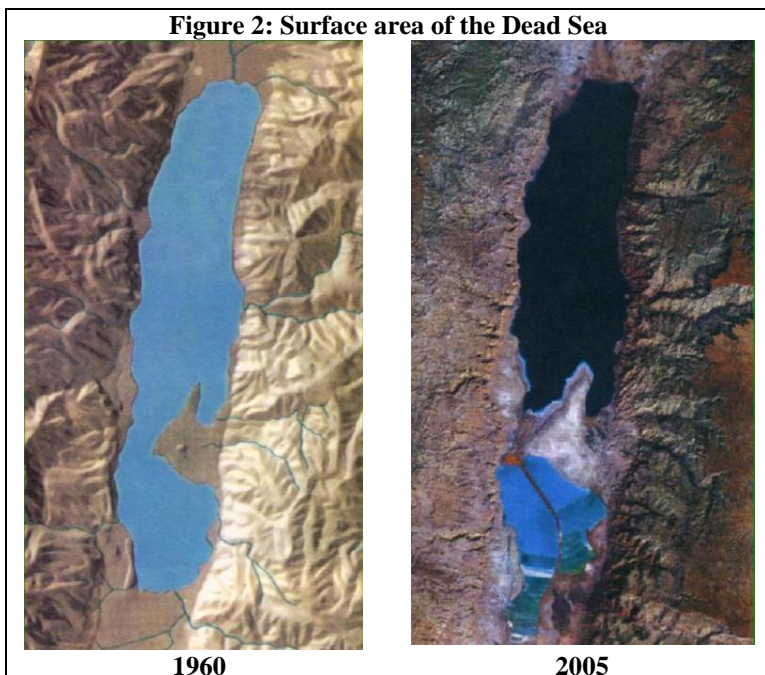


Figure 2: Surface area of the Dead Sea

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 degradation has already been incurred in the Dead Sea area.

Current degradation 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 and cultural degradation 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 the 1994 Jordan-Israel Peace Treaty and in reference to the integrated development of the Jordan Rift Valley area, the two parties considered examination of 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 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 Arabah/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, use of pumping and/or energizing a

potential desalination plant. Over time, part of the conveyed water could be desalinated for potable water distribution to municipalities and tourism industry 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 Study Program Process and the Role of the World Bank

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.

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 initiated during the course of the Study Program implementation include a Study of Alternatives, a Red Sea Modeling Study and a Dead Sea Modeling Study. According to the revised schedule, the Study Program will be completed by end June 2011.



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 December 2009, eight bilateral donors have made firm commitments to financing the Study Program. The donors are: France, Greece, Italy, Japan, South Korea, The Netherlands, Sweden and the United States of America. At present, the multi-donor Trust Fund amounts to US\$16.7 million making the Study Program fully funded.

Activities of the Study Program are being overseen and guided by a Technical Steering Committee consisting of a delegation of four from each Beneficiary party. Each delegation is chaired by its respective head of the water authority. By the request of the Beneficially Parties, the Committee has two representatives from and is chaired by 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. The nine member Panel of Experts was appointed in September 2009 and will also review all the Study Program reports.

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.

Present Status

In summary, the Study Program is progressing well and all tasks are on track. All studies are expected to be completed by end of June 2011. In advance of the final reports, it is expected that most of the major technical results will be known by February 2011 when the draft final reports are submitted. An update on the reports and stakeholder consultations follows below.

Feasibility Study and Environmental and Social Assessment. The Feasibility Study and the Environmental and Social Assessment were awarded after international competitive bidding in April 2008 to two independent consulting firms: Coyne et Bellier (France) is leading the Feasibility Study and ERM (UK) is leading the Environmental and Social Assessment. On 15 June 2010 Coyne et Bellier submitted the draft Report on Sub-Studies B&D, which has been subject to a detailed review by the Study Management Unit and the Panel of Experts. Upon approval of the revised report by the Technical Steering Committee, it will be posted in the Study Program website. On 12 February 2010 ERM submitted the Initial Assessment Report, which is available on the Study Program website. Two reports summarizing the extensive archeological survey work undertaken by the firm have recently been submitted and are under review.

Red Sea and Dead Sea Region Modeling Studies. These studies were awarded in January 2010 to Tahal (Israel) and Thetis (Italy), respectively, following a competitive selection processes. The kick-off meetings for these studies took place over the period 7-11 March 2010. They were combined with a short study tour of the region. Inception reports were submitted in March 2010 and are now posted in the Study Program website. Best Available Data Reports from the two firms were submitted in July and are now being revised after review. Mid-term reports are due from each consultant in mid-October 2010.

Study of Alternatives (SoA). A Study Team conformed by three individual consultants supported by three Senior Level Researchers was appointed in October 2009 to carry out the SoA. The SoA Team is currently working on the evaluation and the comparison of strategic alternatives to address environmental problems, caused by the decline of the Dead Sea and augment the supply of water to the Beneficiary parties. Alternatives under consideration by the SoA Team include: (i) the no action alternative; (ii) the proposed Red Sea-Dead Sea water conveyance with desalination and hydropower generation; (iii) lower Jordan River options; (iv) water transfer options (including the Med-Dead conveyance and a pipeline from Turkey); (v) desalination options; (vi) technical and water conservation options; (vii) additional options identified by the consultants; and (viii) a combination of various options. The Preliminary Draft SoA Report was received on 8 August 2010 and was subject to a detailed review by the Study Management Unit and the Panel of Experts. It is now being revised by the SoA team. Public meetings in the region are planned to take place in early 2011 to discuss the SoA

Draft Study of Alternatives Report. Dates and venues of the meetings will be posted on the Study Program website.

Public Consultations. So far three rounds of public consultations have taken place to provide an update on the overall Study Program. The most recent one took place in Amman, Aqaba, Eilat, Jerusalem and Ramallah over the period 13-20 June 2010. The consultations were advertised in advance in national newspapers, on the Study Program website and via emails and faxes. The attendance was good, with 40-90 people present at each meeting. Question and discussion sessions were held during the consultations and a summary of the issues raised will be available on the RDS website by December 2010. Among the major issues raised by the stakeholders were the following: (i) the need to slow down the pace of the study in order to devote more time for the analysis of the technical issues and the alternatives; (ii) the need to speed up the studies in order to get on with solving the Region's water crisis; (iii) concerns over the energy requirements of the proposed scheme; (iv) a concern for a full review of alternatives to the Red Sea – Dead Sea Water Conveyance; (v) a desire for more consultation at the local level; (vi) the need for a pilot scheme before the implementation of the full proposed scheme, and (vii) concerns over who will make the determination to go ahead with a project when the Study Program is completed.

High-Level Meetings. So far nine meetings of the Technical Steering Committee (TSC) have taken place in the region and each had the participation of the Beneficiary Parties, the World Bank, the Study Program consultants and members of the Panel of Experts. The last TSC meeting was held in July 2010 and was hosted by the Palestinian Authority. Since the inception of the Study Program, three Donors Committee meetings have taken place.

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