



## **EcoPeace's Vision for Stabilizing the Water Level of the Dead Sea**

The Dead Sea, in fact a terminal lake, is the lowest place on the continental Earth, lying in the Jordan Rift Valley and creating a wonderful landscape between the Judean desert to the West, and the Moab Mountains to the East. The Dead Sea is internationally known for its unique geological, historical and ecological values placing it as one of the natural wonders of the world. The Dead Sea waters are rich in minerals and renowned for its therapeutic qualities. The combination of salt water with sweet spring water and hot desert climate induced the growth of unique vegetation and animals, some of which are endemic to this area. Important historical sites are located along the Dead Sea (Qumran, Masada, Machaerus) and so it became an important attraction for millions of tourists who visit the area.

The Dead Sea level is receding by more than one meter every year. This decrease had led to an ongoing ecological disaster generated by human activity. The main factors behind the Dead Sea's retreat are the diversion of waters from the Jordan River and its various tributaries, and the activities of mineral extraction industries on both sides of the Sea. Since the 1960s, the sea level has fallen by more than 30 meters and more than 6,000 sinkholes have opened up around the sea's shoreline, resulting in irreparable damage to nature, infrastructure and tourism.

According to projections and research, the Dead Sea needs an additional 700-800 MCM of water annually to stabilize its water level (Alla at el 2014). Despite the various proposals, including the current limited pilot proposal of the Red Dead Canal project, these initiatives do not provide a solution for stabilizing the sea level and preventing its continued receding.

What is needed is the promotion of sustainable solutions that tackle the core of the problem including the partial rehabilitation of the Jordan River, the main natural water source of the Dead Sea and mitigating the Mineral Industries environmental impacts. EcoPeace asserts that we can reach this goal only through regional cooperation between the countries bordering the Dead Sea and with the help of the international community.

EcoPeace calls on decision makers to promote a solution which includes:

1. Additional water flow to rehabilitate the Lower Jordan River and the Dead Sea.
2. Reducing the water use of the mineral industries in Israel and Jordan.

A combination of these two solutions will achieve the desired additional quantity to halt the sea from further retreat.

We believe that the implementation of these two solutions will result in the additional water quantity needed to halt the Dead Sea's retreat.

## **Solution 1: Adding a Significant Amount of Water to the Lower Jordan River - Implementing the Master Plan for the Rehabilitation of the Lower Jordan River**

Water is a scarce resource. Climate change and the forecast of drought years ahead have brought the Jordan Basin to an acute state of demise. Even in the north of Israel the springs and streams are under threat. EcoPeace has prepared a master plan for the rehabilitation of the Lower Jordan River, which significantly increases the amount of water flowing into the Dead Sea by 2050 (EcoPeace, 2015).

The master plan for the rehabilitation of the Lower Jordan River is based on a multi-purpose strategy, which includes water uses for economic / tourism and ecological purposes, and water transfer for various uses, while maximizing ecological and economic values of the water flow and addressing the local needs of the basin's residents.

The Royal Haskoning DHV consulting firm used a WEAP model to examine the scenario of adding manufactured water (desalination and/or treated wastewater) to the drainage basin together with additional natural water (from the Sea of Galilee and Yarmouk Basin) to the Lower Jordan. The Israel Water Authority is presently planning for the reversal of the National Water Carrier that can supply desalinated water to the Upper Jordan River and/or the Sea of Galilee. Based on the additional water the EcoPeace Master Plan requires an estimated 240 MCM annually to flow out of the Sea of Galilee into the Lower Jordan.

According to the plan the Lower Jordan will be divided into three flow segments:

- Northern section: Sea of Galilee > Harod stream. In this section the water quality will be that of the Sea of Galilee. The flow in this section will be designated for different uses including local demand and for the agreed upon transfers to the Kingdom of Jordan (including the new water exchange agreement of 50 mcm annually).
- Middle section: Harod stream > Qasr al-Yahud. In this section the water quality will be that of remaining fresh water with the addition of treated wastewater. The flow in this section will be designated for extensive agricultural use.
- Southern section: Qasr al-Yahud > Dead Sea. In this section the water quality will be that of treated wastewater and saline water, including brine from any desalination that might take place in the Valley that cannot be used for agriculture.

For the full details regarding the quantities and quality of water in each section, please see the Master Plan [here](#).

The population of the Jordan basin is expected to reach 30 million by 2050, and the continuous strain on water resources will only increase. Hence, researchers estimate that the only solution is water reuse and increasing water desalination for all residents of the basin. According to the Master Plan an increase of the amount of water entering the Dead Sea to 300 MCM (compared with less than 100 MCM today) is possible, if treated wastewater can be made available to flow south of Qaser el Yahud into the Dead Sea.

Recent studies (Malkawi and Tsur, 2016), (Alla et al. 2014) estimate that by 2050 there will be an additional 2 billion cubic meters of treated water for the entire region - a significant addition to various water uses. Most of the water will be used for irrigation, but potentially about 400 MCM could be made available as additional water to the Lower Jordan River and Dead Sea. The studies present the need for a comprehensive agricultural reform to compensate farmers in the area for the allocation of water to the Jordan Basin. The entire plan's economic feasibility was examined and approved using cost-benefit models per cubic meter (Malkawi and Tsur, 2016).

What is still outstanding is the need to study the impact of treated wastewater flows into the Dead Sea to confirm that there are no negative environmental impacts and as to what level of treatment would be required for the sewage that might flow from the Jordan River into the Dead Sea. EcoPeace together with local universities are currently seeking funding to undertake the needed study.

## **Solution 2: Reducing the Mineral Industries Water Use**

Since the late 1970s, the Dead Sea has been divided into two basins: the northern basin, which functions as the Dead Sea, and the southern basin, which are the evaporation pools of the Israeli and Jordanian mineral industries. Construction of the pools began in the late 1960s on both sides of the border, and since then, the plants have been pumping water from the northern basin into the southern basin for minerals extraction using an evaporation process. This activity is a significant factor that contributes to the negative water balance of the northern basin. Research indicates that the northern basin's deficit is 250-330 mcm / year (Gavrieli at 2011). This deficiency is the cause for the lake's shrinkage by more than 20% and an increase in salt concentration by 4% (Lansky N. Vedanta A. 2015). Following a parliamentary question submitted in 2013 to the Ministry of Environmental Protection, the Ministry responded that the industries are responsible for 45% of the sea level retreat, 30% caused by the industry on the Israeli side and 15% caused by the industry on the Jordanian side. Therefore, it is clear that the mineral extraction industries on both sides significantly contribute to the Dead Sea's retreat.

The mineral industries are privately owned plants that do not pay a direct fee to abstract water from the natural northern basin of the Dead Sea, that are then pumped

by industry to industrial evaporation ponds. There is therefore no incentive for the mineral extraction industry in Jordan or Israel to use scarce Dead Sea water efficiently.

In a modern economy, every industrial plant pays for the water it uses in their production process. There is no shortage of examples of industries for which water is a precious and expensive commodity, and hence plant owners consider the efficiency of every drop used. The agricultural sector is a good example of how regulation combined with technology has, over the years, led to maximum efficiency in water use.

## **Conclusion**

The Dead Sea water level can be stabilized by a combination of increased flow and reduced evaporation to meet the 700 mcm quantity need annually - but we must act now. In the longer-term strategic vision, it is possible to stabilize the Dead Sea water levels by allowing significant amounts of water to flow into the Jordan River from manufactured sources that will then flow to the Dead Sea (300-400 million MCM according to the Master Plan), together with reducing the factories water pumping (up to 330 million MCM).

## **Recommendations**

- 1) The mineral industries have to find ways to compensate the dead sea and return the water quantities they abstracting from it. If not paying the economic price, they should return water from other resources.
- 2) A review of the mineral industry concessions in Israel and Jordan is required from an environmental perspective. In the case of Israel and the Dead Sea Works the concession will expire in 2030 and is already under review.
- 3) Study the impact of treated wastewater flows into the Dead Sea to understand what might be negative environmental impacts for the Jordan and the Dead Sea.
- 4) Study the adaption of technology such as membrane technology for use in the mineral industries' extraction processes that would significantly reduce water use.
- 5) The Israeli and Jordanian government should establish a public fund financed by the Mineral Industries' tax revenue. The fund could finance research on alternative technology for mineral extraction without the need for pumping from the northern basin.
- 6) The authorized bodies in the Israeli government should approve and implement a plan for additional desalinations plants in the north of Israel in order to decrease use of the natural water in the Jordan River Basin.
- 7) The establishment of an international Trust Fund for the rehabilitation of the Jordan River Basin including the Dead Sea. The regional governments and the international community should join forces for the implementation of a "Marshall Plan" which will include international financial support to rehabilitate the Jordan River Basin.
- 8) List the Dead Sea in the IUCN's World Commission for Protected Area's "Green List".

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