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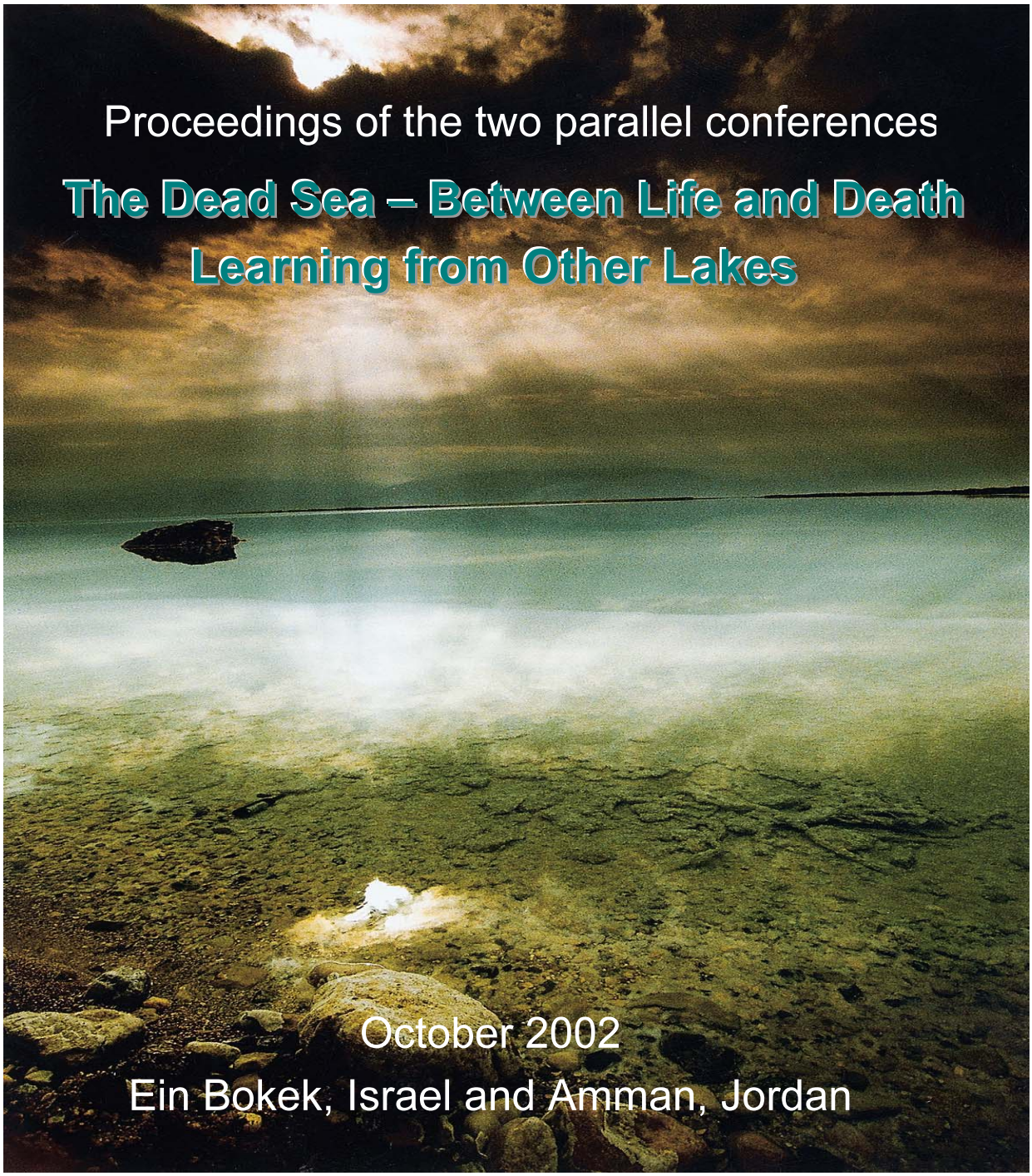

Proceedings of the two parallel conferences

The Dead Sea – Between Life and Death
Learning from Other Lakes

October 2002

Ein Bokek, Israel and Amman, Jordan

This document has been produced
with the financial assistance of the European Community

Friends of the Earth Middle East (FoEME) is the only regional organization in the Middle East that brings Jordanian, Israeli and Palestinian environmentalists together for the promotion of sustainable development.
Our primary objectives are the protection of our environmental heritage and the creation of necessary conditions for lasting peace in the region.
FoEME has offices in Amman, Bethlehem and Tel-Aviv.

www.foeme.org

The Global Nature Fund is a non-profit, private, independent international foundation for the protection of environment and nature.

www.globalnature.org

The Dead Sea Basin is a member of an international network of lakes called Living Lakes supported by the Global Nature Fund.

www.livinglakes.org

This document has been produced with the financial assistance of the European Community. The views expressed herein are those of the presenters in the conferences and can therefore in no way be taken to reflect the official opinion of the European Community.

Note of Gratitude

The editors would like to thank all contributors to both conferences, the participants and the photographers who sent pictures to both the Jordanian and Israeli Dead Sea photo contest.

We wish to recognize our additional partners to the Israeli conference and photo contest, מסע אחר

Masa Acher Magazine, and the sponsors to the Israeli conference: the Tamar Regional Council, the Dead Sea Medical Research Center and the Hyatt Regency Dead Sea.

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Proceedings of two parallel conferences: Ein Bokek, Israel and Amman, Jordan

Editors: Yana Abu Taleb, Gidon Bromberg, Stefan Hörmann, Sagit Porat

Photographs: Front cover photo by Leonid Padrol, winner – 1st prize, Israel photo contest.

Inner cover photo by Miriam Jubeh, winner second prize, Jordan photo contest.

Other Dead Sea photos by: Amram Yaacobi, Howard Clapsaddle (Israel photo contest winners), Ala' Jasser, Samir Atalla (Jordan photo contest winners).

Mono Lake pictures by Warren Marr.

Conference photo by Mari Murahashi (FoEME).

Contents

1 Introduction

Friends of the Earth Middle East (FoEME) and the Global Nature Fund (GNF), in cooperation with the Masa Acher Magazine (only at the Israeli Conference) and with the support of the European Union, held two parallel international conferences on the challenges facing terminal and saline lakes from water diversion with a major focus on the Dead Sea. The Dead Sea is one of currently 23 partner regions of the international network “Living Lakes” – an initiative coordinated by the Global Nature Fund with the aim to facilitate exchange of know-how and experiences between local stakeholders in order to promote the conservation and sustainable development of lakes and wetlands worldwide.

The conference on the Israeli side of the Dead Sea took place at Ein Bokek on October 9, 2002, and three days later there was a parallel conference in Amman, Jordan. Both conferences were attended by around 150 people who represented international organizations, civil society organizations, regional and local governmental authorities, local businesses such as tourism, industry, media and other stakeholders from the Dead Sea Basin.

The two conferences brought together the experience of similar lakes from around the world. In Mono Lake in California a compromise was negotiated with competing water users that has guaranteed the viability of the lake. In the Aral Sea lack of negotiated settlement is destroying the environment and livelihoods of the communities in its vicinity. The institutional structures in place for the management of saline and/or terminal lakes were presented with an emphasis on basins that cross political boundaries.

The Dead Sea, at the lowest point on earth and known worldwide as a major tourist attraction with unique natural features, is under threat precisely due to water diversion projects both upstream and downstream. The experience gained from other parts of the world on how to approach the problem, and the lessons learnt from allowing the situation to just further deteriorate, can greatly assist efforts to promote sustainable development around the Dead Sea.

A major issue in the presentations and discussions at both meetings was the joint proposition of Israel and Jordan presented at the World Summit on Sustainable Development in September 2002 to construct a 300 km long pipeline – the so-called “Peace Conduit” - from the Red Sea to the Dead Sea to stop the loss of water.

The conference helped to raise local, regional and international media attention and public awareness to the fate of lake ecosystems and the fate of the Dead Sea in particular.

The Dead Sea - shared by Israelis, Jordanians and Palestinians

2 Dead Sea Conference Programs and Winning Photos of Dead Sea Photo Contests

Welcome you

The Dead Sea – Between Life and Death

Learning from Other Lakes

Wednesday, October 9, 2002
Hyatt Regency Dead Sea

Program

09:45-10:00 Coffee and refreshments

10:00-10:30 **Greetings**

Dead Sea Photo Contest – Awarding of Prizes
Gidon Bromberg, Friends of the Earth Middle East
Ami Ben Basat, Masa Acher Magazine
Stefan Hörmann, Global Nature Fund
Stefano di Cara, Counselor, Delegation of the European Commission to the State of Israel
Dan Shachaf, Tamar Regional Council

10:30-12:00 **First Session: Lessons From the World**
Chair: **Sagit Porat,** Dead Sea Project Coordinator, FoEME
Geoffrey McQuilkin, Co-Executive Director, Mono Lake Committee
Mono Lake and the landscape of hope
Takehiro Nakamura, Program Officer (Water), UNEP
The Aral Sea Crisis, Lake Chad
Discussion

12:30-13:30 Lunch

13:30-15:00 **Second Session: Views on Saving the Dead Sea**
Chair: **Ami Ben Basat,** Masa Acher Magazine
Gidon Bromberg, Israeli Director, Friends of the Earth Middle East
A Biosphere Reserve at the Dead Sea
Valerie Brachya, Senior Deputy Director General, Ministry of Environment, Israel
Preparation of Dead Sea Government Policy
Dr. Ittai Gavrieli, Israel Geological Survey
The "Peace Conduit" - Plans and the Research Model
Discussion and Conclusion

An exhibition of award winning and selected Dead Sea photos on display.

This conference was made possible with the kind assistance of the European Union and the Global Nature Fund (GNF).

Friends of the Earth Middle East

in Cooperation with the

Global Nature Fund

Cordially Invite you to a Conference

The Dead Sea-Between Life and Death

Learning from Other Lakes

Saturday, October 12, 2002 - Radisson Sas Hotel
Ambassador Hall, Amman, Jordan

This conference was made possible with the kind assistance of the Global Nature Fund (GNF) and the European Union (EU).

Program

09:00-09:15 Coffee and Refreshments

Greetings

09:30-09:45 Munqeth Mehyar, Chairperson Friends of the Earth Middle East

09:45-10:00 Stefan Hoermann, Global Nature Fund

First Session: Lessons from the World

10:00-10:30 Geoffrey McQuilkin, Co-Executive Director, Mono Lake Committee

Mono Lake and the Landscape of Hope

10:30-11:00 Discussion

Second Session: Views on Saving the Dead Sea

11:00-11:30 Zafer al-Alem, Secretary General Jordan Valley Authority

The "Red-Dead Canal" Project

11:30-12:00 Abdel Rahman Sultan, Friends of the Earth Middle East

A Biosphere Reserve at the Dead Sea

12:00-13:00 Discussion and Conclusion

13:00 Lunch

End of Day

Winning Photos of the Dead Sea Photo Contests

The two winning photos of the Dead Sea photographic contests: Ala' Jasser (top), First Prize, Jordan; and Leonid Padrol (left), First Prize, Israel

3 Welcome Notes

3.1 Munqeth Mehyar and Gidon Bromberg – FoEME

The work of Friends of the Earth Middle East through a grant provided by the European Union has helped raise the political awareness to protect the Dead Sea and place this issue at the center of the political debate both regionally and internationally. The joint call at the Johannesburg Summit by both Jordanian and Israeli Governments to save the Dead Sea by building a conduit from the Red Sea to the Dead Sea (RDC) is reflective of the level of political interest the issue has obtained. FoEME, with EU support, succeeded to convince the governments of the region that they have the primary responsibility to reverse the ecological crises occurring at the Dead Sea. As a result, the discussion today is far more positive. We can all agree that there is a man made crisis and our discussion centers on what is the best way to reverse this crisis. At FoEME we believe that saving the Dead Sea requires a comprehensive look at the challenges facing not only the Dead Sea but the Dead Sea Rift Valley as a whole. What is required is a comprehensive feasibility study to be carried out along the full length of the Dead Sea Rift Valley from the Sea of Galilee in the north to the Gulf of Aqaba in the south. The study must involve all the Jordanian, Israeli and Palestinian water users and consider the competing interests at hand.

We are delighted to have our guest speakers here to present lessons learnt from two opposite experiences, Mono Lake and the Aral Sea. Mono Lake is a success story, where community led action is restoring a unique ecosystem. A compromise was struck and though the water level will not rise to its historic height, the beauty of the area as a whole is being restored. The demise of the Aral Sea is due to lack of cooperation and political commitment between the riparian countries. The Aral Sea reminds us of where we might be headed if we do not act but also of the need to act in a comprehensive fashion, well planned and thought out. That is the challenge before us and the purpose of this conference.

We are grateful to all our co-sponsors, supporters and speakers, especially to those that came from afar.

3.2 Ami Ben Basat – Masa Acher Magazine

Masa Acher, being the largest nature, geography and environment magazine in Israel, and being committed to values of environmental preservation, is and will be doing to the best of its ability to expose the current situation of the Dead Sea and to encourage the taking of immediate steps to solve the problems facing it.

3.3 Dan Shachaf – Tamar Regional Council

Good Day,

I apologize on behalf of the Chair of the “Tamar” Regional Council who was unable to be here during the first part of the conference, due to other obligations. We hope he will be joining us later on. On his and the “Tamar” Regional Council behalf, I greet you all: welcome.

A special greeting to the organizers of the conference, who have initiated the lovely photo exhibition outside, and of course this important discussion.

We cannot ignore the growing interest in the country and around the world to the issue of the Dead Sea. Unfortunately, the reasons for that are not necessarily happy ones, however, who knows, perhaps some sweetness (or in our case – saltiness) will result of these difficulties, and the growing awareness will also bring about a change in the situation.

May we all have an interesting and enjoyable conference.

3.4 Stefan Hörmann - Global Nature Fund

Excellency, Ladies and Gentlemen, dear friends,

On behalf of the Global Nature Fund, the co-organizer of this conference, I would like to express a cordial welcome to you. For almost two years now the Global Nature Fund together with Friends of the Earth Middle East has had the intention to organize an event at the Dead Sea which would bring stakeholders from the region and international experts together in order to discuss and help to find solutions for the protection of the world's saltiest large water body.

Even though we were not able to realize our former vision of holding only one big conference attended by stakeholders from all three parties, we are very pleased to hold this meeting here in Ein Bokek and another one in two days on the Jordanian side, in Amman. I would especially like to thank our partners from Friends of the Earth Middle East and Masa Acher for the perfect organization of this conference.

The Global Nature Fund - G-N- F - is a non-profit and non-governmental organization based in Germany and acting at an international level with the aim to promote sustainable development and nature conservation.

In 1998 the Global Nature Fund started the international lake partnership Living Lakes with the aim to promote sustainable development, the conservation and restoration of lakes and wetlands worldwide. Currently 23 lakes on 4 continents are members of the Living Lakes network. Among them are Lake Baikal in Russia – the largest surface freshwater reservoir in the world, the Pantanal Wetlands in South America, California's Mono Lake and Lake Constance - a freshwater reservoir for 4.5 Million people and resting place for more than 200.000 birds - which is bordered by Germany, Switzerland and Austria. The lakes are represented in the network by local environmental organizations, most of them non-governmental. The Dead Sea is represented by Friends of the Earth Middle East and became a member in the year 2000.

The motivation to promote the protection of lakes and wetlands are various:

We all know that lakes are of extreme importance for men and nature. Most of them are blessed with a great diversity of wildlife and plant species.

On the other hand it is people who rely upon lakes for drinking water, food, transportation or just for recreation and contemplation.

But nowadays almost all lakes all over the world face man-made problems. Major problems - some of which we find also to a more or lesser extent at the Dead Sea- are

- Nutrient enrichment of the water bodies
- Toxic pollution
- Tourism and settlement expansion in sensitive shoreline areas
- Over-fishing and introduction of alien species
- Water-diversion of lakes and its tributaries for irrigation purposes, for industry and household.

If you look at our partner lakes you will find that more than one third of the Living Lakes face or faced the problem of diversion. The most threatened lakes are Dead Sea and Lake Chapala, Mexico's largest lake. The Dead Sea water level is dropping at an average rate of 1m. Lake Chapala, a shallow lake, will dry up within the next few years if no drastic conservation programs will be implemented.

With the Living Lakes project GNF aims at reversing these negative developments. Our objectives are

- to promote models for sustainable development in lake regions in fields like water management, restoration of damaged ecosystems and conservation of biodiversity.
- to support the constant exchange of know-how and information between stakeholders in lake regions via internet and conferences like this one
- to promote mutual support between partners in carrying out projects and
- to put lake issues on the regional and international agenda through the lobbying power of a global network.

To achieve our goals we cooperate with governmental authorities and with partners from the business sector. The Living Lakes network is supported by the company Unilever, our global partner, the German Airline Lufthansa, DaimlerChrysler as well as the cellular network operator T-Mobile and the company Kärcher, producer of water cleaning devices.

Coming now back to the Dead Sea and the purpose of this conference, I would like to highlight the following:

The Living Lakes Partnership wants to share solutions to the problems that occur at lakes. Even though not all solutions might be transferable to other lakes, they may still generate useful ideas and new approaches. Therefore, I am extremely happy that Geoffrey McQuilkin from the Living Lakes partner organization MLC will show how the tremendous water drop of the Californian Mono Lake has been reversed and restoration measures been implemented after a long struggle and finally through joint efforts of the stakeholders.

The Dead Sea and the people living in the region have been suffering from the non-sustainable exploitation of resources in the Dead Sea Basin. GNF welcomes that the governments of Israel and Jordan recognize the necessity to save the Dead Sea and to jointly work together. We hope that the Palestinians as third party sharing the Dead Sea will get involved in these efforts as well.

Nevertheless we share concerns regarding the plan to build a channel linking the Red Sea to the Dead Sea. A very detailed and comprehensive environmental impact assessment carried out by an independent party is indispensable in order to prevent negative impacts on the entire region and its ecosystems. Just to mention a few aspects which still need closer consideration and clarification:

- What will be the potential damages to the Red Sea ecosystem with its unique corals?
- What will be the impacts of diverting Red Sea water into the Dead Sea on the chemical composition of Dead Sea salt water?
- What about the danger of water leakage of the canal which leads over freshwater aquifers in a seismological active zone?

Alternative options should be taken into account that might help to protect the Dead Sea and provide water for the daily needs of the people in the region. All possible measures to save water, especially in the agricultural sector, to reuse water and to explore new non-conventional water resources should be looked at and be implemented at a regional level.

And finally, water diversion is not the only problem threatening the Dead Sea. It is also threatened for example by insufficient sewage treatment and expansive tourism development plans. A holistic assessment and planning in sectors like tourism or transport is needed. The UNESCO's Biosphere Reserve concept might provide a very useful framework for this.

I strongly believe that this conference and the one in Amman will help to understand the very complex issues and contribute to save one of the most fascinating places in the world – the Dead Sea. - Thank you.

3.5 Stefano di Cara - Delegation of the European Commission to the State of Israel

Dear friends,

I am honored to have been invited today to participate to this event.

The European Commission, which I represent here on behalf of Ambassador Chevallard, has contributed in the past years to the financing of several projects having a distinct regional dimension. Our aim was to provide a tangible contribution to joint actions that were supportive of the peace process. We intended to bring together public and private bodies in neighboring countries by encouraging them to cooperate on themes of common interest. Because of their unquestionable transnational dimension and their impact on future generations, environmental issues are among the best candidates for this type of actions. It is saddening that the present political and security crisis in the region have considerably slowed down the implementation of these regional initiatives. We remain however convinced of the validity of the approach. As today's conference shows, we will continue our efforts to keep these projects alive by supporting as much as possible their implementation on separate parallel tracks, hoping that in the near future they could merge again as joint actions.

It was in the context of these regional projects that our Delegation came in contact with FoEME. In the past years we have established an excellent professional cooperation with them. We do appreciate their dedication and their commitment. I would like therefore to congratulate FoEME, and in particular its Director Gidon Bromberg and the project coordinator Sagit Porat, for their successful efforts in raising awareness in Israel and abroad about the serious environmental problems affecting the Dead Sea and its surrounding environment.

As I was also given the honor to award the first prize of the photo competition sponsored by Masa Acher. We all have admired and enjoyed the beautiful exhibition of photos that were selected for the attribution of the prize. Luckily I did not have to participate to the selection, as it must have been very difficult to choose among the excellent works received. Let me therefore address a special tribute to all the photographers that have participated to this context.

I thank you for your participation and contribution at this conference and I wish to all of you a productive and fruitful day of work. Thank you.

At the Dead Sea Conference in Ein Bokek Stefano di Cara from the EU Delegation to the State of Israel (middle left) handed the award to Mr. Leonid Padrol (middle right), winner of the Dead Sea Photo Contest in Israel. On the left: Ami Ben Basat (Masa Acher Magazine), on the right: Gidon Bromberg (FoEME Israeli Director)

4 Lessons from the World

4.1 Geoffrey McQuilkin, Co-Executive Director, Mono Lake Committee
Mono Lake and the Landscape of Hope

Good day! It's exciting to be here for the Dead Sea Conference and to have met with such an enthusiastic, knowledgeable group of people. It's also wonderful to be here with so many knowledgeable individuals committed to reaching a better future at the Dead Sea.

I'm here from nearly halfway around the world, from a town called Lee Vining in the mountains of California, from a sister salt lake called Mono Lake that has suffered from its water being diverted to Los Angeles. And yet, at Mono Lake, we've achieved remarkable successes in protecting the lake, its streams, and surrounding habitat, all while meeting the real water needs of the people of Los Angeles. I'm here to share some of the history of the Mono Lake protection effort and offer some insights on how the lessons that we learned at Mono can inform the hard work ahead here at the Dead Sea.

Let me start with an ecological and historical profile of Mono Lake and the water issues that have swirled around it for 80 years. The Dead Sea lies well below sea level; Mono Lake, by contrast, sits at 2000 meters above the ocean and winter storms blanket its shores with snow every year. Yet both are located in arid regions. Mono Lake lies east of the towering Sierra Nevada mountain range which capture much of the moisture from winter storms. Like the Dead Sea, Mono Lake is a terminal lake; because of the geology of the region, streams flow into the lake but none flow out. As a result, salts have accumulated over the near-million years of Mono's existence, making the lake 2.5 times as salty as the ocean. That's a modest one fortieth of the Dead Sea's salinity, and it's enough to create a unique lake ecosystem.

Mono Lake Profile

Salinity: 78 g/l

Size: 73 sq miles / 190 sq km

Depth: 58 ft / on average

Level: 6381.9 feet / 2067 meters
+7 / 2 m since SWRCB, 11 / 4 m to go

The lake is too salty to support fish. Instead, a unique species of brine shrimp known as *Artemia Monica* thrives on abundant algae. Trillions of these shrimp fill the lake's water and together with plentiful alkali flies along the shoreline they are a non-stop food supply for migratory and nesting birds. And birds visit by the millions. In the spring, 50,000 California Gulls fly across the mountains to nest on the lake's protected islands. And as the summer comes on, two species of phalaropes make an appearance, winging their way toward South America. In fact, 80,000 Wilson's Phalaropes (10% of the world population) make Mono their major food stop—when they leave, they fly an incredible 5000 kilometers without stopping to Argentina. In the fall, 1.5 to 2 million Eared Grebes (30% of the North American population) descend on the lake, consuming tons of brine shrimp and fattening up for migratory journeys of their own to the Gulf of California.

Mono's tributary streams wind down from 3,700 meter peaks carrying snowmelt to the lake. Along their paths they support—or supported, below the diversion dams—rich streamside forests of cottonwoods, willow, and Jeffrey pine. Fish thrived in their waters and songbirds nested along the banks. The stream corridors hold exceptional ecological significance because they provide wet, forested habitat that is extremely rare in the arid high desert of the region. Four of these streams were fully diverted to Los Angeles, turning them into bone-dry washes, destroying the downstream habitat.

That's the quick profile of the lake and as I talk about Mono Lake, please keep in mind that I am referring to more than the lake itself. I'm including the tributary streams that feed the lake, the rich habitats they support, the birds that migrate through, and indeed all the ecology of the watershed. The same, I think, is true here when we talk of saving the Dead Sea.

What has happened at Mono Lake is a benchmark - a watershed in its own right - in the history of water rights and water use in California and the West. In the early 1900s, Los Angeles bought up virtually all the water rights in the Mono Basin, and began diverting water into its aqueduct in 1941. Soon thereafter four of Mono's five year-round tributaries were bone dry and the lake began a steady fall that stretched to 15 vertical meters (not quite as far as the Dead Sea, but very significant, representing half the lake's volume). Salinity more than doubled, shooting upward toward 100 g/l, making the lake 2.5 times saltier than the ocean. Historic water diversions averaged 125 million cubic meters (mcm) per year.

Like the Dead Sea, the native wildlife was severely impacted and faced destruction. Like the Dead Sea, birds that depend on the ecosystem during lengthy migratory journeys were threatened. Like the Dead Sea, a recreation-based economy that depended on the lake was threatened by the destruction of the very place people traveled to see. Like the Dead Sea, the argument was made that it was too late, too complicated, too expensive, too unrealistic to do anything about the problem. And, as I hope we see at the Dead Sea, a coalition of groups pushed back, found answers, and forged a new life for a rare, unusual, ecologically critical area.

There is no single magic solution for the Dead Sea, of course. But it is helpful to review what worked at Mono Lake for ideas.

The first Mono Lake T-shirts said "Mono Lake - it's worth saving." I've noticed a similar call here to "Save the Dead Sea." Salt lakes like these are neglected, misunderstood, and generally under-appreciated. Even the Great Salt Lake - named in honor of its briny waters - suffers this problem. I was there recently and of the lifetime residents I asked, none even knew where to visit the lake.

That phrase - worth saving - sums up much of the challenge: convincing people that there's something of value here that will soon be lost. Once people visit these lakes and their rivers, streams, and wetlands, once they experience them, they are amazed and impressed. And once they care about them, they want to protect them. This conference is a sign that, with the Dead Sea, that message is reaching people.

So what worked at Mono Lake?

First you have to understand the lake. Scientific research is the foundation of the entire effort to protect Mono Lake. Science revealed the many unique aspects of Mono Lake, from tufa towers to Eared Grebe migrations to efflorescent salt flats that cause toxic dust storms, allowing us to say why the lake is worth saving and what the problems were and would be due to excessive water diversions. Science also stretched our understanding of the problem itself, broadening us from concern about the lake to understanding and being concerned about the massive losses of streamside habitat on Mono's diverted tributaries, to realizing the tremendous damage done to waterfowl before anyone showed up to really worry (how bad? Consider a waterfowl migration that today is 1% — 1% — of its historic size of a million birds).

Science also allowed the Committee to formulate a real-world position on what the solution was to the problem. Sure, the solution was water, but how much water? The Mono Lake Committee never wanted all the water back in the lake. The Committee never wanted as much water as could be wrangled out of LA back in the lake. The Committee wanted enough water to protect the ecological resources of the Mono Lake—and, using science, it investigated and defined and put a precise number on that amount of water.

Second, you need to help people make that realization that the lake is worth saving. Early in the Mono Lake effort, Committee founder David Gaines essentially asked LA: can't we share

the water? The answer: no, it's too late, not practical, too expensive, not legal—and why would anyone care anyway. 20 years later, hundreds of thousands Californians and many public leaders wanted to see Mono Lake saved, and it was.

There's never a good argument for destroying a lake. Fresh, salty, or somewhere in between, lakes are too important to lose, especially in arid lands. The proposal that the world would be a better place by trading away Mono Lake for Los Angeles was unacceptable on the face of it. But to share why a lake is worth saving you have to get down to the real-world reasons destruction is unacceptable—the threats posed, for example, to the birds, the brine shrimp, the volcanic islands, the wetlands, the streams, the tufa towers, the local economy.

At Mono Lake, all these specifics had to be explained in great detail, again and again. The explaining happened in a lot of ways: in the press, on daily natural history walks, in our public information center, on the pages of the Mono Lake Newsletter, and through the Mono Lake slideshow presented to just about any group that would listen—and a few the wouldn't.

The key is to share all that information. The *secret* is to show that you love the place yourself while doing it. You have to love talking to that elderly couple that used to throw rocks from the highway into the lake before it receded a mile. You have to be excited to talk to that student with the term paper due tomorrow. When someone asks, you have to know where that little spring is just east of that sandy area near that willow clump. You have to know the place.

Mono Lake in California. Photograph by Warren Marr

Third, you need a strategy to achieve protection. Unavoidably, at Mono Lake, a piece of the strategy was legal, and we were fortunate that it became groundbreaking for California. Many avenues were tried, and two were successful. The first related to state Fish and Game codes, which state that dam operators must allow enough water to pass to keep fish downstream in good condition. That four of Mono's streams were ever allowed to go bone dry lay in old water politics. So when the El Nino years of the early 1980s came, and runoff exceeded the capacity of the aqueduct, and water and fish flowed over the diversion dams, and the codes were used in court by the Committee, California Trout, and others to stop those streams from being shut down again.

The big legal argument, however, lay in the state constitution. When bodies of water like Mono Lake are involved, California as a state has an obligation to protect the public trust—the wildlife, recreational, and aesthetic values. The concept of public trust has long and deep roots, tapping back to the Roman Empire, drawing on the concept that the air, oceans, and running water must be protected for the public good. Public trust responsibility cannot be given away, and the fact that the state failed to consider the public trust values of Mono Lake when issuing water rights to Los Angeles stood as a glaring failure.

In partnership with the National Audubon Society, the Committee filed a suit that went to the California Supreme Court and created a precedent in water rights. The court wrote: "The human and environmental uses of Mono Lake—uses protected by the Public Trust doctrine—deserve to be taken into account. Such uses should not be destroyed because the state mistakenly thought itself powerless to protect them." Los Angeles' water rights would have to be reevaluated as a result. The State Water Resources Control Board took on the task and produced the 1994 decision set a higher management level for Mono Lake, required restoration of the streams, and allowed the continued diversion of some water to the city.

Litigation is but one piece of the strategy that led to success at Mono Lake. Many of the other pieces you are familiar with: public involvement, media attention, legislation, agency review, fundraising. Many of those pieces, in fact, can be planned and put into action better than I can suggest by folks here in this room today. I think I need not dwell on them. Let me instead emphasize the strategic component that made the Mono Lake protection effort unique and uniquely compelling: solutions.

The Mono Lake Committee never said: Mono Lake is a special place that must be protected and Los Angeles must figure out how to get by with less water.

Instead, the Committee always said: Mono Lake is a special place that must be protected and Los Angeles can do it at minimal cost through conservation and water reclamation programs. The conservation programs include deploying low flush toilets citywide and implementing best management practices. Reclamation involves tertiary treatment of wastewater to replace fresh Sierra water for industrial uses and groundwater recharge. With reclamation, LA has the ability to reuse water in the urban system, helping drought-proof it as well.

Those ideas came early on. And when LA replied, "nice idea but it'll never work," we participated in the panels and worked on the committees and ran the numbers to show how it could work. And when the reply came: "great, but it's too expensive," we worked with legislators to make more than US$60 million available for the facilities—provided the water saved was credited to Mono Lake.

That US$60 million was in many ways the piece that made all the difference because anyone—anyone—looking at the Mono Lake issue saw a problem with a solution and simply asked: how fast can this be wrapped up. The Department of Water and Power saw it too, didn't like what they saw, and through delays let US$24 million slip away. But it finally bought into the plan. And today the Department and the City are extremely proud of the fact that they use the same amount of water as in the early 1970s—despite adding a million residents to the city's population.

It took 20 years to do all that and we are proud today to be still working on these facilities and conservation programs. It takes a lot of work no question. But that work created an extremely stable result for Mono Lake.

What the Mono Lake Committee learned is that ideas are cheap, but good ideas are only slightly more expensive. A good idea for a solution just didn't go that far on its own. We had to embrace Los Angeles, work with the City we had to make the City's legitimate concern for its water supply our own concern, and we had to show that those good ideas could be done, and we had to make those good ideas into reality. Telling the city how to run their water

business, in short was not enough; we had to show it would work, get the money, see the conservation programs put into place, and help celebrate the results.

Protecting Mono Lake wasn't about trying to get rid of Los Angeles as a water user, and protecting the Dead Sea isn't about trying to get rid of the legitimate needs of people in Israel, Jordan, and the Palestinian territories for water. Our opponents wanted to portray us that way, but they couldn't because we were looking for solutions to LA's real water needs as much as we were looking for water for Mono Lake. It was a highly successful approach because it was honest, and I see the seeds of it here again at the Dead Sea. My advice: work diligently on comprehensive solutions that addresses real water needs and real economic needs with both the Dead Sea and people equally in mind.

After the drop of the water level at Mono Lake - underwater tufa tower dominate the scenery. Photo: Warren Marr.

There's another lesson learned at Mono Lake that is particularly relevant here. At Mono, Los Angeles had to learn to live within limits. It can have some Mono Lake water but not all the water. The thing to remember is that even with all the water, the city would still have had to learn to live within limits. Now it is doing so with a vibrant, recovering ecosystem at the other end of its aqueduct. It could have had to do the same thing with a toxic saline sump at the top of the aqueduct.

The point simply is: Over-allocated watersheds have to deal with the problem sooner or later. We did it sooner, and today we have Mono Lake to show for it.

That's what you are after here at the Dead Sea: resolve these problems now, not later; do it before worse things happen to the ecosystem. Salt lakes like Mono Lake, the Dead Sea, and the Aral Sea are gauges. They are simple measures of our water use. Use a lot of water, and they go down. Use too much water and they die. They are like thermometers, taking the temperature of our human systems of water acquisition and consumption. In California, Los Angeles had a water system that had left the zone of safe consumption and was running in the red danger zone. Every meter of Mono Lake's decline showed that.

We do have to pause here to consider a hard question. Why not just write off one lake? Let it decline, go super hypersaline, dry up? Isn't that the price of progress? Isn't it worth more to get that water to people than to some salty sea? For those who just don't care at all about the Dead Sea, I have this message from our experience in California: you don't have to care, but you still have to deal with the problem. Not caring about the problem of a dying lake system does not make the problem go away.

Let me give a few examples that show why.

At Mono Lake, Los Angeles ultimately committed 74 million cubic meters (60,000 acre-feet) of water and several million dollars to fund a restoration program. In comparison, at Owens Lake, a nearby salt lake 100% dried up by water diversions, Los Angeles has for decades avoided, delayed, and otherwise tied up the process of dealing with the toxic dust storms that come from the lakebed—one of the liabilities resulting from excessive diversions. So they've 1) had staff and lawyers dealing with the problem for decades and 2) now committed up to

50 million cubic meters (40,000 acre-feet) of water and US$250 million dollars to solve the problem. Today 5,300 bubbler sprinklers and 7 million meters of drip tubing are spreading that water and Los Angeles is in the business of farming over 1,000 hectares of saltgrass. They denied the problem right up to the turn of the century (and regarding some points, right up to today) but the problem did not go away.

At the Salton Sea—a somewhat salty, below sea level lake in southern California—the Bureau of Reclamation puts the cost of handling the increasing salinity and pollution problems there in the range of US$250 million to US$1.5 billion, with no plan yet in place and the prospect of water transfers from thousands of hectares of nearby agricultural land confounding the search. Similar to here, many engineering solutions are being proposed, such as piping water from the Gulf of California, evaporation ponds to control salinity, distillation devices, and diking the lake into very salty and less salty portions. Solutions will have to be found and the problem occupies the time of local residents, local government, environmental groups, California's water agencies, and even the US Congress.

Let's look at the Colorado River for a moment. The river is the lifeblood of the American West, delivering 15 billion (15,000,000,000) cubic meters of water annually to eleven western states. The Colorado River Delta is almost entirely decimated. A miniscule piece of the 800,000 hectare wetland today survives on a trickle of water. It unarguably was and could be again one of the richest biological resources in the west. The complications of the delta issue may best match those here at the Dead Sea, for the Delta is immensely complicated, involving 7 US states, 2 nations—Mexico and the US—and a river over-allocated by cubic kilometers of water. But the destruction of the delta is a big problem, it isn't going away, and even urban focused water agencies like the Southern Nevada Water Authority concede the delta must be part of debates about how to allocate Colorado River water.

So did Los Angeles benefit long-term from evading the Mono Lake problem for 20 years? No. Has Los Angeles benefited long-term from evading the Owens Lake problem for decades longer? No. Does the southern California farmers benefit from putting off solutions for the Salton Sea? No. Will the US and Mexico achieve long-term benefit from ignoring the Colorado Delta? No. Let me carry that list around the world and ask, will anyone achieve long-term benefits from ignoring the Dead Sea problem? I suggest clearly the answer is no.

Only one thing makes problems go away: real, workable, effective solutions. And we need those solutions before the Mono Lakes of the world dry up and become the Owens Lakes. So it's extremely exciting to be at this conference and see the search for those solutions taking such a big leap forward.

When you stand at the shore of the Dead Sea and gaze westward, across the Mediterranean and the Atlantic to America, remember the good things that have happened at Mono Lake. Today, the message I bring is ultimately short and simple: cooperative solutions and lots of hard work were successful at Mono Lake. Building on the energy and potential partnerships here in this room today, they can be successful again at the Dead Sea.

It is my hope that, ten years from now, we are having a conference similar to this at Mono Lake. At that conference, I hope our friends from the Dead Sea are making a presentation like this one, helping those of us at Mono Lake understand how to solve the challenges we face with tourism and development. And I with those words of wisdom I expect to hear of the great progress made in saving the Dead Sea.

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4.2 Takehiro Nakamura, United Nations Environment Program (UNEP)

UNEP's Approach to Shared Lake Basin Management with reference to lakes whose water levels are going down

Environmentally Sound Management of INland Waters Program (EMINWA)

Basin Approach

- Human activities and natural processes in the basin affect the quality and quantity/availability of lake/river water for both humans and aquatic ecosystems; and
- Enhancing cooperation among the riparian countries, and stakeholders in the basin.

Integrated Approach to river and lake basins, particularly internationally shared basins

- Consideration of all factors related to environmental and natural resources conditions in the basin: hydrological, geochemical, socio-economic, cultural and political factors
- Institutional arrangements for assessment and management of water resources and aquatic ecosystem

Internationally Shared Basins

- Importance of political agreement and technical understanding of the basin and causes for its degradation
- Based on the understanding of the environmental conditions-agreement on basin-wide or regionally-coordinated remedial measures
- Institutional mechanism
- Stakeholder participation

Three-tier Approach

- Development and agreement of a **DIAGNOSTIC ANALYSIS** (Analysis of the environmental conditions, causes for changes and identification of hot spots)

  Zambezi River (Angola; Namibia; Botswana; Zimbabwe; Zambia; Malawi; Tanzania; Mozambique) **Lake Chad** (Chad; Niger; Nigeria; Cameroon and CAR), **Mekong River** (China; Myanmar; Thailand; Laos; Cambodia; Vietnam) **Lake Erhai** (China) **North Xinjiang** (China) **San Juan River** (Nicaragua and Costa Rica) **Lake Titicaca** (Peru and Bolivia) **Aral Sea** (Uzbekistan; Kazakhstan; Tajikistan; Turkmenistan; Kirgiz)

- Based on it, development of an **ACTION PLAN** (a set of remedial measures to address identified environmental issues)
  Zambezi River, Lake Chad
  Catalyzed
  Lake Erhai, Aral Sea
  GEF - Bermejo River; San Francisco River; upper Paraguay; San Juan River

- **IMPLEMENTATION** of the Action Plan (involving donor coordination, stakeholder participation and capacity building

The Case of Lake Chad

Lake Chad

- The basin is shared by Nigeria, Niger, Cameroon, Chad and Central African Republic (Algeria and Sudan)
- Lake water-level going down (natural? Irrigation?)
- Diagnostic Analysis and master plan (UNEP/UNSO)

Lake Chad Basin

- 1964 Fort Lamy Convention
- Lake Chad Basin Committee (LCBC)
- Extended Membership
- Changed role of the basin committee - environmental mandate

Lake Chad

- UNDP/UN/GEF/LCBC Transboundary Diagnostic Analysis and Strategic Action Program
- UNDP/World Bank/GEF/LCBC pre-feasibility study on investment (pilot activities)
- Other donor activities

Major Remedial Measures Proposed

- Integrated river basin management for basins of major tributaries (Chari-Lagone-Komadugu-Yobe)
- Wise use of and restoration of wetlands
- Feasibility on inter-basin water transfer
- Environmental legal framework

The Case of the Aral Sea

Aral Sea Basin

- Shared by Uzbekistan, Kazakhstan, Tajikistan, Turkmenistan, Kirgyz (Afghanistan and Iran)
- Salt lake
- Lake level going down (major water intake?)
- Pollution (salt; pesticides)
- Ecological change
- Health

Aral Sea Basin Population

	Area (1000 km^2)	% of basin	Population 1959	Population 1970	Population 1980	Population 1989
Uzbekistan	448.8	24.6	8119	11973	15961	19906
Kirgyz	126.7	7	1010	1434	1815	2238
Tajikistan	143	7.9	1981	2941	3953	5112
Turkmenistan	491.2	26.9	1516	2188	2861	3534
Kazakhstan	302.2	16.6	1180	1766	2131	2420

Aral Sea

- Irrigation agriculture was carried out in the second half of the 20th century on a large scale
- reclamation of large areas salted and otherwise unsuitable land with a shortage of irrigation
- population growth and intensive application of chemicals in agriculture (mainly for cotton production)

Land Use in the Aral Sea Basin

- Total 151 million ha., 99 million ha of agricultural land
- In Uzbekistan 90% of all farmland (7.4 million ha) is irrigated
- In the irrigated land, cotton (51%), fodder (27%), grain (16%), potatoes, vegetable and melon (5%)

Aral Sea water loss

Year	Water level **(m)**	Surface area **(km^2)**	Volume **(km^3)**	Salinity **(g/l)**
1960	53.41	66,900	1,090	10
1971	51.05	60,200	925	11
1976	48.28	55,700	763	14
1991	37.31 (L) 38.41 (S)	33,800	290	App.30
2000 (estimate)	31.90 (L) 38.00 (S)	21,421	140	65-70 (L) App.36 (S)

Surface Runoff Loss

- Losses by industrial and agricultural activities, human populations and evaporation from reservoirs
- Agricultural irrigation - diversion of water from rivers, operational wastes back to rivers
- 85% to 98% of anthropogenic use of runoff is for irrigated agriculture

Causes of the Aral Sea Environmental Degradation

- Regional economic development strategy
- Introduction of cotton
- Development of rice cultivation
- Irrigation of unprepared land
- Use of low productivity land
- inappropriate use of agricultural drained water

Consequences of Water Balance Variations

- Rise of groundwater table on and irrigated land
- Increase in discharge of high mineral content.
- Decrease river water flow, desiccation of deltas and disappearance of delta lakes
- Decline in the Aral Sea water level, increase in salinity, destruction of aquatic ecosystem, formation of land, climatic variations

Impacts

- Change in terrestrial and aquatic ecosystem
- Changes in salinity
- Wind-induced movement of salt from the exposed Aral Sea bed

Causes of the Aral Sea Basin Environmental Degradation

- Lack of economic incentives for production and management shortcomings
- Inadequate monitoring of the environment, population and economy
- Inadequate environmental education
- Inadequate research efforts

International Response

- World Bank/GEF, UNDP, EU/TACIS
- UEP-REAP

Measures Proposed or Introduced

- Integrated water resources management
- Wetland restoration
- Rehabilitation of disaster areas
- Agricultural practices and drainage
- Upstream land and water management
- Harmonized reservoir management
- (inter-basin water transfer?)

5 Views on Saving the Dead Sea

5.1 Gidon Bromberg, Israeli Director, Friends of the Earth Middle East and Abdel Rahman Sultan, Friends of the Earth Middle East, Jordan

A Biosphere Reserve at the Dead Sea

1. The Uniqueness of the Dead Sea Basin

The many unique characteristics of the Dead Sea Basin include:

- The Dead Sea, located in the Syrian - African Rift Valley, is the lowest place on earth; its surface is 414 meters below sea level.
- The Dead Sea is the world's saltiest large water body -- its salt concentration ten times higher than the Mediterranean.
- The entire basin is a spectacular landscape characterized by high mountain cliffs, deep canyons, and green oases, which are in stark contrast to their dessert surroundings.
- The basin is the home of rare plants and wildlife including leopards (already greatly diminished), Ibex and hundreds of bird species (including the globally threatened Lesser Kestrel and Griffin Vulture).
- It is a cradle of human culture with sites of high value for the three monotheistic religions Islam, Christianity and Judaism such as Mount Nebo, the Qumran caves, the Baptism site of Jesus and Islamic fortress of Karak.
- The region is a unique, world-recognized location for medical and health treatment due to the Dead Sea's mineral composition, the medicinal mud, the hot springs, and the climatic conditions.

2. The Challenges at the Dead Sea Basin

Despite its unique features and rich diversity, the Dead Sea Basin's ecological and environmental status is being degraded and seriously threatened by unsustainable economic developments and source-water diversions -- resulting in:

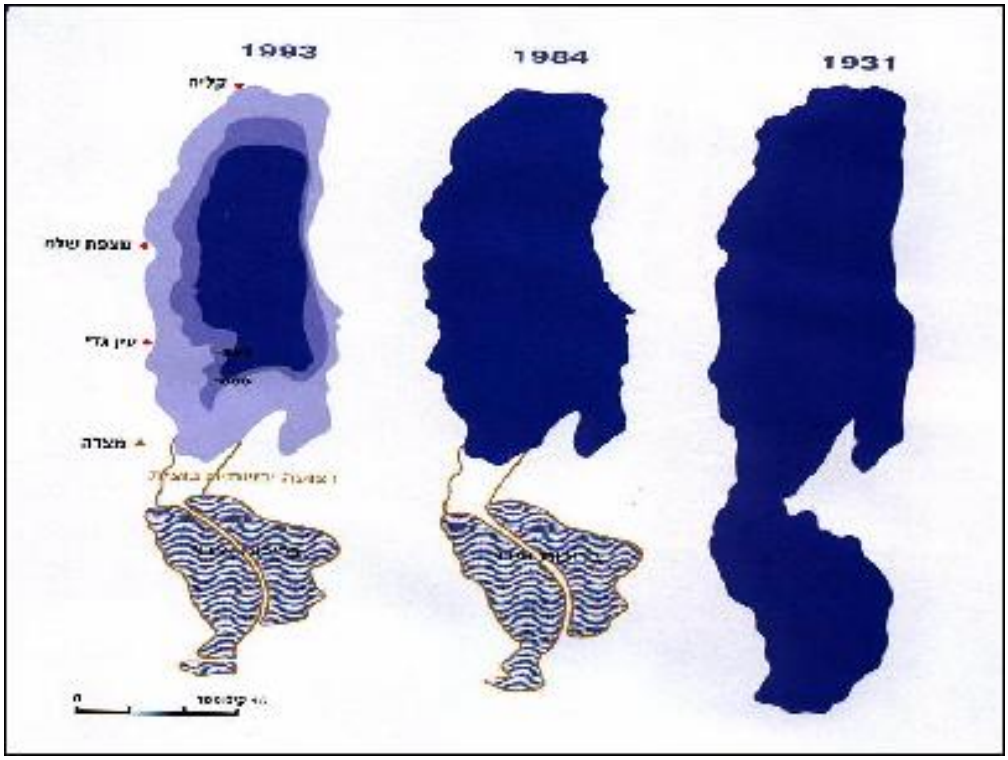
- an alarming rate of drop of the sea level- currently falling at a rate of 80cm to 1m in depth per year. Over the past three decades the water level fell by about 25meters.
- shrinking of the sea's length (north to south) -- from over 75km earlier in this century, to 55 km at present.
- land deterioration (sinkholes) along the shorelines.
- water pollution from untreated or inadequately treated domestic, agricultural, tourist facility, and industrial waste.
- destruction of landscape and ecologically sensitive habitats for flora and fauna.

The following economic sectors are the primary competitors for the DSB resources and significantly contribute to the unsustainable development pattern currently in place and/or proposed by various agencies and organizations:

- The water sector and its continuous expansion of water and irrigation projects to supply the demand of domestic, agricultural, tourist and industrial sectors
- The mineral extraction industry and its increased production and mining activities through the Israeli Dead Sea Works and the Jordanian Potash Company

- The tourism industry and its massive planned construction of new hotels
- The transport sector and its proposed construction of new transport infrastructure like the planned Israel Highway 80 through the pristine Judean desert
- Uncoordinated development among the bordering nations and often even among economic sectors and public agencies within the same nation.

Dead Sea Surface



3. The Strategy - Designing a Biosphere Reserve

Why a Transboundary Biosphere Reserve at the Dead Sea Basin?

The Biosphere Reserve concept is characterized by a holistic approach to nature protection and human development promoting cooperation at local, regional and international level.

The Tragedy of the Commons

The Dead Sea Basin is a single ecosystem. The fact that it crosses international borders does not make one particular area independent of the other in an ecological sense. Development undertaken to date has generally ignored issues on the other side of the border. The development model to date is characterized by each side seeking to maximize their efforts to exploit the DSB's resources without any consideration of the sum total impact or carrying capacity of the Basin as a whole.

The transboundary Biosphere Reserve concept provides the framework for a much-needed regional management plan for integrated sustainable development. The concept foresees the creation of a trilateral management authority that would be responsible for developing a regional master plan and coordinating national development patterns so as to achieve optimum benefit to the Basin as a whole. Economically and ecologically infeasible or regionally degrading development (such as the cumulative total of 55,000 new hotel rooms currently proposed around the Dead Sea) could therefore be avoided.

A Framework for Regional and International Cooperation

The Biosphere Reserve designation would strengthens cooperation and improve communication at the regional and international levels. The Biosphere Concept encourages cooperative activities in the field of scientific research, conservation measures, education and training between the institutions within a Biosphere Reserve. On the international level all registered sites become members of the World Network of Biosphere Reserves. This network enables exchange of experiences between stakeholders living in similar environments and joint activities between the different Biosphere Reserves. In addition, formation of a tri-national management arrangement could well become a model for addressing issues of other endangered transnational ecosystems and regions.

Balancing the Needs of Man and Nature

The Dead Sea Basin is currently characterized by a few nature reserves with little or no connection to each other and no framework of how developments proposed outside declared reserves impact the protected areas. Hence in the proposed tourism development plans for example, hotels are planned in a linear fashion along the Dead Sea, outside reserves but with very probable negative impacts on the habitat of the reserves.

In contrast to individual protected areas with little connection to their surroundings, the concept of a Biosphere Reserve aims at a wider ecosystem approach. The DSB Biosphere Reserve would contain several protected core areas surrounded by buffer zones of limited development which themselves are encompassed by -- or linked to -- transition areas where most human development would occur. This idea of gradation and integration of man and nature makes the Biosphere Reserve concept so attractive and effective. The Dead Sea Basin still encompasses highly sensitive areas of rich biodiversity (potential core areas), open spaces with very limited development (potential buffer zones) and concentrated industrial areas and rural and tourism settlements (potential transition areas). Areas and features outside the Basin, but which are critical to its protection and sustainability - such as the Jordan River and other water sources -- will be studied and planned as influences.

Increasing Public Participation - more public support for conservation

The Biosphere Reserve concept provides for the involvement of local communities and stakeholders in planning and management of the Biosphere Reserve. Lessons from other Biosphere Reserve show that success can only be secured when interests of different stakeholders in the land are taken into account. The Dead Sea Basin 's sustainable development can only be achieved when all the multiple interests represented through farmers, the tourism industry, local communities etc. are addressed. The flexible and creative approach of a Biosphere Reserve allows for conflict resolution and alternative models of land use and nature protection. The possibility of public support for conservation efforts is higher than in conservative approaches, which tend to neglect human interests in access to natural areas and use of resources.

4. The Concept - Dead Sea Basin Biosphere Reserve

4.1 Boundaries of the Dead Sea Basin Biosphere Reserve

The boundaries and sub-boundaries of each factor considered are complex. The water catchment area of the DSB extends into Syria in the north and almost reach Aqaba in the South. From a cultural perspective the Nabatean trade routes that cross the Dead Sea, extend all the way from Gaza to Oman. A compromise therefore had to be reached that would identify an area for the proposed reserve that would be ecologically coherent and practical from a management perspective.

Different boundaries were therefore proposed for different combinations of factors. The northern boundary has been proposed to go as far as Ouja and Sartaba on the basis of

cultural and visual considerations. The southern proposed boundary has been identified as Fifa and Neot HaKikar on the basis of ecological uniqueness and visual considerations. The western limit of the Dead Sea's water catchment area running north-south between Hebron and Jerusalem has been identified as the western boundary of the proposed Reserve. The ridge road making its way from Madaba to Karak has been identified as the eastern boundary on the basis of visual and administrative considerations.

Regarding the potash industries the recommendation is to seek to include them into the reserve as they directly exploit the resources of the basin and therefore excluding them would be contrary to basic MAB principles. Clearly strict conditions of sustainability would need to be adopted by theses industries should they agree to be included. Another consideration is the extent of inclusion in the transition areas of large urban centers such as Jericho. It was thought that this should be left to the wishes of the local populace. Finally other areas outside the proposed boundaries could be considered as part of a separate but linked Biosphere Reserve or part of a transition zone as defined by the MAB program.

Suggested Boundaries for the Dead Sea Biosphere Reserve.

4.2 Functions and zones of the DSB Reserve:

According to its functions of conservation, development and logistics the Biosphere reserve encompasses a composition of core areas, transition areas and buffer zones. For the Dead Sea Basin several locations were identified which can perfectly fulfill these functions. Some sites need further study in order to identify their potential and status.

4.2.1 Biosphere - conservation function and core protected areas

The conservation of biological diversity and its preservation in a core area is a main feature of the Biosphere Reserve. The Dead Sea Basis (DSB) contains a variety of unique ecosystems that are not found in any other part of the world. The Dead Sea itself is a singular ecosystem with endemic forms of life. Stretching out from the seashores in all directions, a series of unique ecosystems are identified. While semi-tropical marshland,

mudflat and wetlands' ecosystems are identified on the northern and southern tips of the Dead Sea; desert and arid ecosystems are identified in the west and north-western areas of the DSB. River and Wadi ecosystems surround the Dead Sea and are adjacent to rocky - mountainous ecosystems that contain a variety of globally unique flora and fauna.

Within the contemplated Dead Sea Basin Biosphere Reserve the following major core areas are identified due to their ecological importance. Dead Sea itself, Wadi Mujib (The lower part), Ein Gedi (Parts of), Ein Feshkha, Nahal Hever, Lisan Peninsula, Wadi Fifa, Neot Hakikar Marshlands and the Baptism Site.

4.2.2 Buffer - securing the core - providing for research and education

The buffer zone surrounds the core area and protects it from human impacts. For the Dead Sea Basin Biosphere Reserve the buffer zone is recommended as all the none-built-up areas in visual contact with the Dead Sea and to include the non-residential and non-industrial users. The potential activities for the buffer zone should be clarified within the planning of the Biosphere Reserve. According to UNESCO provisions it could include conservation research, recreation - eco-tourism, education, training and monitoring.

4.2.3 Man - Development function and transition areas

In this section sectors and areas of the Dead Sea Basin with potentials for socially acceptable and environmentally sound development are identified. The transition area of the Dead Sea Basin Biosphere Reserve includes all the human settlement including housing and industrial areas together with areas that have no direct visual connection to the Dead Sea.

Industry
The two major industries in the Dead Sea Region are the Arab Potash Company on the Jordanian side and the Dead Sea Works on the Israeli side. The issue of whether to include the two companies within the Biosphere Reserve's transition zone was briefly discussed above.
The companies' enormous use of fresh water and salt water - contributing to 25% of the Dead Sea water loss, mining activities and other environmentally negative actions -- such as air and water pollution -- cause serious problems to the DSB environment. The companies' adoption of measures of proven effectiveness, to minimize their negative environmental impacts, would have significant positive effects on the Dead Sea's environment. The industries' environmental commitments should include the introduction of actions and programs in relation to

- resource conservation - particularly water
- phase out of production of ozone depleting methyl bromide
- reduction of air and water pollution emission
- and Sea and scenic reclamation/remediation/restoration.

Agriculture
The agricultural areas around the DSB should be considered within two categories: (1) areas not dependent on intervention from outside the area - e.g., grazing, wadi agriculture and areas linked to local springs and (2) areas utilizing piped water or other non-local interventions.

The proposed DSB reserve should seek to promote traditional and environmentally sound agricultural methods (water saving irrigation techniques, methods using less/no chemical fertilizer, herbicides etc).

Tourism
The tourist industry is one of the major demand sectors on the site. Tourism impacts should be categorized according to major issue areas, such as: ecological, culture, health and landscape/aesthetics. To date tourism proposals having been developed independently among the three parties and currently foresee 55,000 new hotel rooms. The Biosphere

Reserve provides the framework for a coordinated tourism plan that would consider the carrying capacity of the basin.

FoEME strongly recommends that tourism construction should be concentrated in a transition area on the northern and southern ends of the basin. A free tourism zone concept should be realized - as has been proposed by FoEME for the northern shore of the Dead Sea where tourists could freely move and where joint environmentally sound tourism projects. The free tourism zone would serve as a significant model of cooperation and sustainable development within the transboundary DSB Biosphere Reserve.

Human Settlement

The Jordanian side is populated by Bedouin families in the north, members of the Hamaydi tribe around Wadi Mujib and the urban townships of the Potash City and Safi to the south, all totaling some 33,000 inhabitants. The Israel side of the Dead Sea includes the Regional council of Tamar with no more than 1,300 inhabitants. The Palestinian areas include Jericho and other villages with some 25 000 inhabitants in urban and rural communities, using the more fertile areas north of the Dead Sea for agriculture.

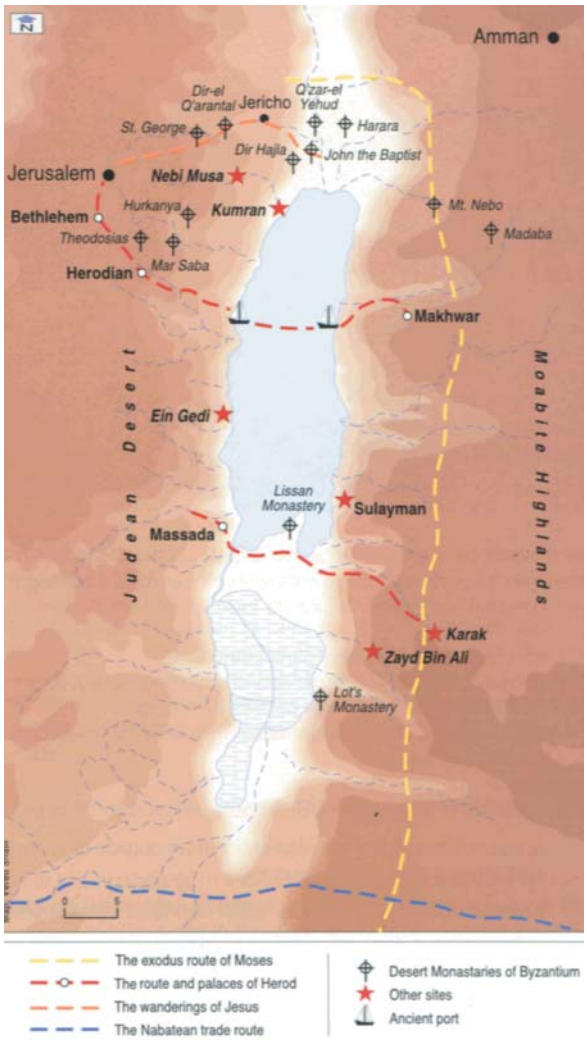
Some of the key questions to be addressed in the proposals of the Biosphere Reserve and its management program are: What will be the interaction of the inhabitants to the employment sources of the region? How will the changes impact the lives of the village tribes of the upper plains above the Dead Sea? What expansion can take place in the existing towns and communities such as Tamar?

4.2.4 Culture - World Heritage Routes and Sites

Part of the uniqueness of the DSB is its impressive range of natural and cultural sites, cultural routes and collections of sites in the Dead Sea region, which might qualify for a World Heritage status. The integration of these proposed World Heritage sites into the Biosphere Reserve would highlight the common heritage of the people of the region and of the world community as a whole. The study identified and recommends the following sites and routes for World Heritage Nomination:

World Heritage Routes and collections:
· the exodus route of the Children of Israel
· the routes and palaces of Herod
· the wanderings of Jesus in the Judean Desert
· the Desert Monasteries of Byzantium
· the Nabatean trade routes

World Heritage Sites:
· Masada: Herodian Winter Palace and Zealot and Byzantine ruins
· Jericho: more than 9000 years old, possibly world's oldest city
· Wadi Mujib
· Karak: proposed as part of a wider inscription including Crusader castles of the Near East.



5. Conclusion

From the outset FoEME has taken the role as a catalyst, calling for the Dead Sea to be allowed to live, be protected from irreversible environmental degradation, and developed only in a sustainable manner; and most recently in promoting the registration of the Dead Sea Basin as a Biosphere Reserve and World Heritage listings. In this time, FoEME has succeeded to bring tremendous local and international media attention to the current fate of the Dead Sea and the need for action.

FoEME is confident that Dead Sea will indeed be registered with UNESCO as a site of world significance, on the basis of the Man and Biosphere and World Heritage listings. Even these listings are not however an end in themselves but just the means to achieve the desired result. After many years of research and study on the Dead Sea, and based on a unique and intimate knowledge of the all the political cultures of the peoples that live by its shores, FoEME is confident that the Man and Biosphere approach and concept has the best chance to achieve the goals of promoting sustainable development around the Dead Sea - "letting the Dead Sea live".

Winning Photo of Dead Sea Photographic Contest – Third Prize, Jordan: Samir Atalla

5.2 Zafer al-Alem, Secretary General, Jordan Valley Authority
The "Red-Dead Canal" Project - Protecting the Dead Sea

1. The Issue

- Protecting the Dead Sea: In less than 50 years the level of the Dead Sea has declined from –395 meters below sea level to – 410 meters, causing damages to the entire ecosystem of the Dead Sea Basin.
- Increasing rate of deterioration: 80% of this decline has occurred since the 1970's. Current rate of decline is about 1 meter per year.
- Dilemma of water demand: Decline is caused primarily by diversion of historical water supply to address the fresh water demand of the riparian parties in a water-scarce region.
- Need for joint large-scale solution: Small-scale local measures will not be sufficient to preserve the Dead Sea. International cooperation is required.

Background

- The Dead Sea constitutes the lowest point on earth.
- Inflow has decreased from 1,300 MCM/yr in the 1930's to approximately 300 MCM/yr in 2000.
- In addition to the deterioration of the sea, a grave environmental damage has ensued to the land and ground water resources surrounding the Dead Sea.
- Environmental damage is documented in numerous studies.

Recommended Solutions

- Most extensive study was conducted in the mid-1990's, within the framework of the JRV Master Plan by the Trilateral Economic Committee (Jordan, Israel and U.S) in conjunction with the World Bank and the Italian Government .
- The Study concluded that a conduit between the Red and Dead Seas best addresses the mutual combined interests of the riparian parties (Jordan, Israel and the Palestinians at a later stage).
- Economically viable alternative alignments for the conduit were identified.

The Consequences of Inaction

The Dead Sea Basin is in Immediate Jeopardy

- Loss of historic Dead Sea.
- Loss of valuable water resources.
- Ecological Imbalances: hydrologic systems, land quality, plant and wildlife habitats.
- Loss of tourism development.
- Loss of social development in the Dead Sea Basin.
- Loss of future economic opportunities.

The Time to Protect the Dead Sea is NOW

There is an Urgent Need for Concerted International Action.

- Severe existing damages, e.g. surrounding groundwater, habitat for wildlife, possible link to sink holes.
- Cultural and historical values are jeopardized.
- The rate of deterioration is expected to escalate in the future.
- Future opportunities for joint regional development will be lost.

Proposed Action

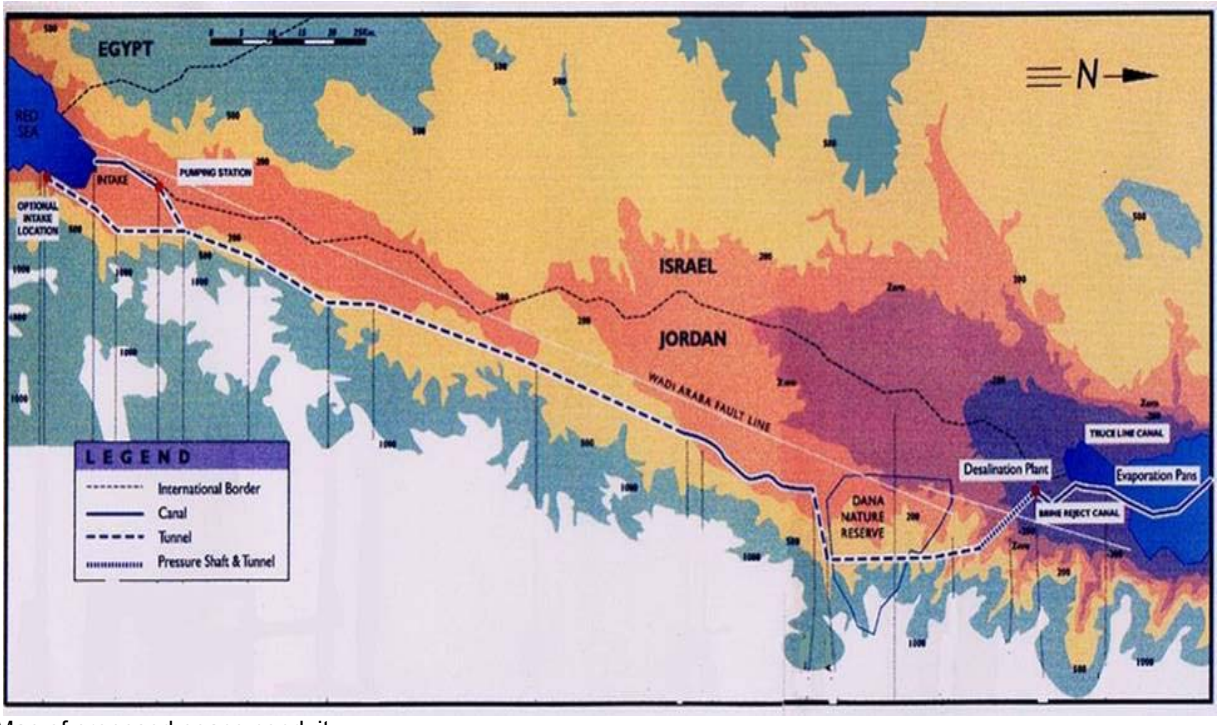
Through the joint efforts of the Hashemite Kingdom of Jordan and the State of Israel a viable solution is attainable.

The Peace Conduit

- Brings additional water to the Dead Sea to mitigate environmental damage and to restore the sea's level.
- Facilitates large-scale desalination projects that can help meet the fresh water needs of Jordan, Israel and the Palestinian Authority.
- Paves the way to future joint economic initiatives throughout the Dead Sea Basin.
- Contributes to the sustainable development of the Dead Sea Basin.

The Peace Conduit:

- Water conveyance system to provide sufficient water from the Red Sea to the Dead Sea.
- Represents a viable measure to mitigate negative environmental and social impacts stemming from the declining level of the Dead Sea.



Map of proposed peace conduit

Mutual Benefits

- The Peace Conduit Can Protect the Dead Sea
- The Peace Conduit Facilitates Large-Scale Water Desalination
- International Heritage: Preservation of historical, cultural and environmental values.
- Regional Economics: Tourism, industry, services, trade and cross-boundary ventures
- Regional Survival: Synergetic solution to regional water problems.
- Global Survival: Vehicle for peace, regional cooperation and sustainable development.

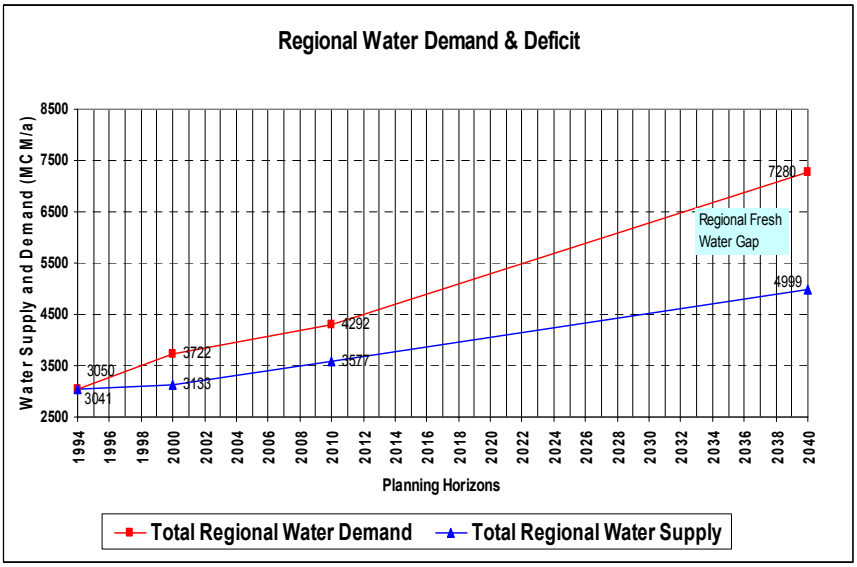
Additional Benefits of the Peace Conduit and Desalination Projects

- Exploits unique renewable energy source: 400-meter drop to generate hydropower energy.
- Energy to create new source of fresh water: Desalination plants will produce up to 850 MCM/yr fresh water sufficient to meet future water needs in Jordan, Israel and the Palestinian Authority.
- Diffusion of future conflicts–generation of new water sources will eliminate chronic disputes in a water-starved region.

Desalination Project

Desalinated drinking water will be conveyed to Jordan, Israel and the Palestinian Authority via pipelines

- Desalination projects scalable and can be developed incrementally to fit demand.
- Up to 1900 MCM/yr feed seawater.
- 45% of seawater will be recovered as fresh water.
- Up to 850 MCM/yr fresh water will be produced to participate in the demand of Jordan, Israel and the Palestinian Authority.
- Additional electricity (550 MW) is required for pumping.
- Brine discharged to the Dead Sea.



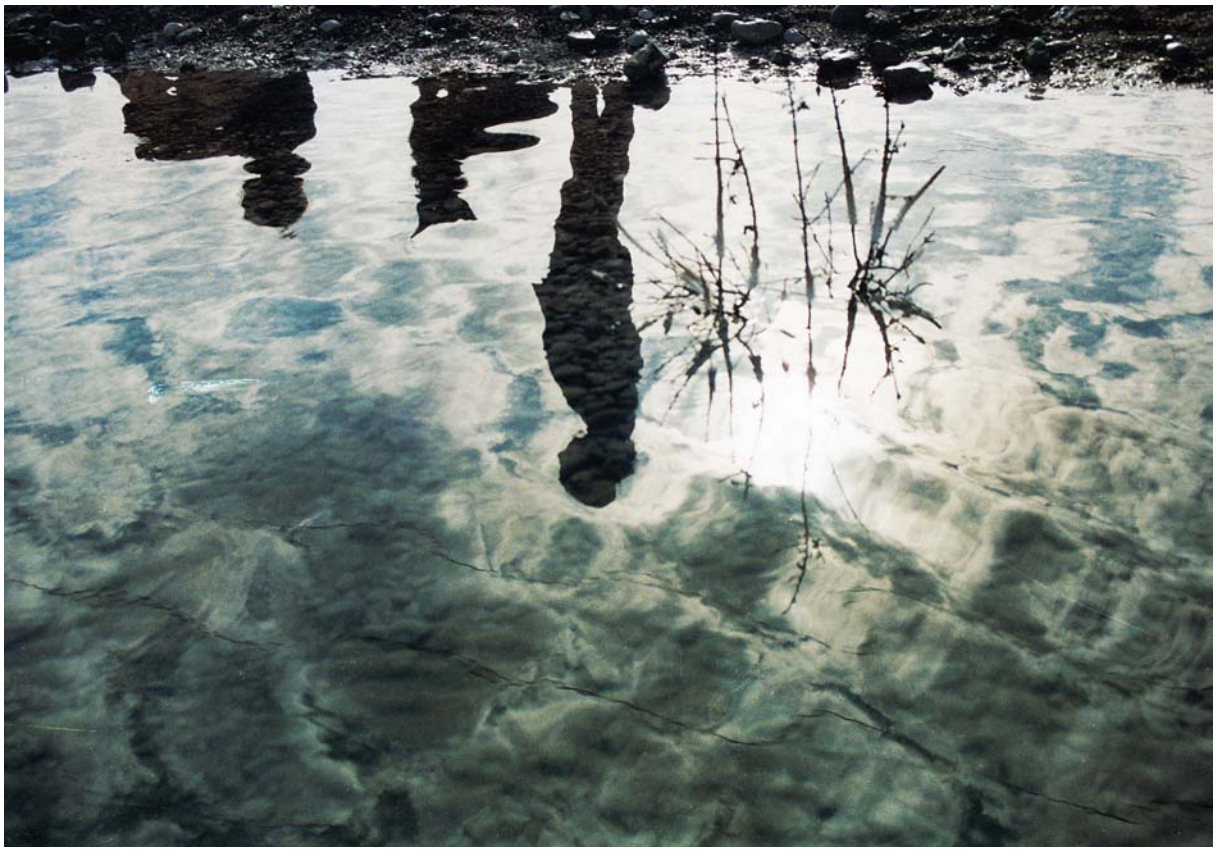
Costs and Financing

- Costs are significant and cannot be shouldered by riparian parties alone.
- Costs and risk can be shared between the public and the private sectors.
- Estimated required investment in Peace Conduit: a minimum of $0.8 billion.
- Peace conduit increases the economic feasibility of desalination and water distribution projects undertaken by the private sector.
- Estimated total required investment for desalination & distribution: $3 billion, with private sector participation.

The Way Forward

We must act immediately to reserve the environmental degradation confronting the Dead Sea and address the regional water crisis.

- Pursue international grants to finance the Peace Conduit (a minimum of $0.8 billion).
- Proceed with process to attract the private sector participation for desalination projects.



Winning Photo of Dead Sea Photo Contest – Second Prize, Israel: Amram Yaacobi

5.3 Valerie Brachya, Senior Deputy Director General, Ministry of Environment, Israel
Preparation of Dead Sea Government Policy

Policy for the Future of the Dead Sea (Israel)

Ministry of the Environment

Ministry of Infrastructure

Ministry of Regional Cooperation

Coordinator – Jerusalem Institute

Purpose of the Policy Document

- Clarification of environmental, economic and social implications of the lowering of DSL
- Analysis of government responsibility for resulting effects of current processes
- Recommendations to government on necessary measures to stabiles processes
- Steps to harness the potential of the region

3 Possible Scenarios

- Default - continuation of lowering DSL
- Peace conduit - Red sea to Dead sea
- Freshwater source - reduce water diversion and add other water sources

4 Study Teams

- Scientific team – interdisciplinary geological and limnological modeling
- Economic team - implications of the 3 scenarios for economic development
- Ecological and environmental team – implications of scenarios on natural resources
- Legal and administration team – public responsibility and liability under the 3 scenarios

Contents of Report

- Predicted future environmental, social and economic situation of the region if no action is taken to change current processes
- Legal and administrative responsibility of government, commercial, public and private interests in the region
- Comparative evaluation of the costs and benefits to the local population, to economic interests and to tourism under the 3 scenarios
- Possible impacts of the influx of Red sea water on the parameters of the Dead sea water, for tourism and for industry

- Preferred DSL and quantity of water needed to prevent damage
- Ecological and environmental implications of the 3 scenarios on the Dead Sea natural resource systems

Policy Recommendations

- Legislation and obligations
- International relations
- Measures to prevent damage and loss of resource values
- Harness potential of the region

Program of Activities

- Interministerial coordination
- Proposed government decision
- Work Plan and budget
- Geological and Limnological Model

Winning Photo of Dead Sea Photo Contest – Third prize, Israel: Howard Clapsaddle

Annex: Protecting the Dead Sea Basin Position of Friends of the Earth Middle East

A Unique Ecosystem to the World

The Dead Sea basin is a unique ecosystem to the world. The Dead Sea, a terminal lake, is the lowest place on earth and the saltiest large water body on the planet. Dead Sea waters are recognized for their medicinal and health treatment. The areas complex geological form has created a spectacular landscape characterized by high mountain cliffs, deep canyons and green oasis. The springs that feed the green oasis attract unique biodiversity, in stark contrast to the desert surroundings. The Basin is a cradle of cultural heritage of utmost value to the three monotheistic religions of Islam, Judaism and Christianity. For all the above reasons the Dead Sea Basin is treasured by people the world over and is a major site of pilgrimage, tourism and industry.

Existing Policies that Threaten the Basin

Despite its uniqueness there exists no integrated development plan for the Dead Sea Basin. The competing sectors, the mineral extraction industry, fresh water supply, tourism, local agriculture and urban development exploit the Dead Sea's resources without consideration of the areas natural carrying capacity. Due to present unsustainable development policies the Dead Sea is a living example of a 'tragedy of the commons.'

Over the last forty years, the Dead Sea water level has dropped by over 25 meters. The current yearly water level decline is by over one meter in depth, and the rate is constantly increasing. This is due to both water diversion upstream and industrial activity, which are responsible for 75% and 25% of the sea level decline respectively. With the disturbance of the water balance, a sinkhole phenomenon has developed with catastrophic impacts on all kinds of development in the region. Sinkholes have damaged roads, parking areas, industrial and tourist facilities. It is not possible to predict the location, scale and extent of new sinkholes, which places real threat to people's lives and assets.

The Call of the Governments of Jordan and Israel to Protect the Dead Sea.

Friends of the Earth Middle East (FoEME) support the Governments of Jordan and Israel for their call made during the Johannesburg Earth Summit 2002 to protect the Dead Sea. We congratulate our governments for recognizing that they are responsible for the environmental problems facing the Dead Sea and that they have the responsibility to solve these issues cooperatively despite the lack of comprehensive peace in the region.

The plan as currently presented by the governments to build a conduit from the Red Sea to the Dead Sea attempts to deal with one of the multiple problems facing the Dead Sea Basin, that is the decline in water level. There is a need to broaden the issues involved in saving the Dead Sea to more than the water level. Raising the water level will do little towards preserving the rich cultural heritage of the basin, nor will it protect the unique topography. Unsustainable tourism development with plans to build thousands of new hotel rooms along the ecologically sensitive corridors of the Dead Sea is threatening the cultural heritage of the area today. Raw sewage flowing from surrounding cities untreated into the Dead Sea is

polluting ecosystems and threatening the tourism value of the Dead Sea as a natural spa and place of healing.

The proposed conduit raises many environmental questions related to the Dead Sea and Red Sea hydrology, water chemistry and impacts on the natural biota. The RDC project components need careful and detailed investigation that involves sophisticated environmental modeling. A thorough and independent environmental assessment is required to consider the overall impact of any proposed project on the Dead Sea, the Araba Valley and the Gulf of Aqaba.

The Call of Friends of the Earth Middle East

In 1998, FoEME produced concept document entitled: “Let the Dead Sea Live” that outlined a comprehensive plan to protect the Dead Sea. The concept document calls upon the government of Jordan, Israel and the Palestinian Authority to recognize the importance of listing the Dead Sea Basin as a Man And Biosphere reserve (MAB) and World Heritage site. Since its publication, FoEME has led a campaign to bring the issue of the protection of the Dead Sea to the highest national, regional and international levels. Developing a regional integrated master plan involving Jordanians, Israelis and Palestinians under the framework of a UNESCO Biosphere and World Heritage registrations are immediate measures that could be undertaken by all three parties together.

Developing a management plan requires the consideration of all the competing interests exploiting the Dead Sea region and balancing those interests according to the natural carrying capacity of the area. A study involving the true economic value of the resources that naturally should be available to the Dead Sea including the fresh water currently being diverted needs to be undertaken. Alternative solutions should be reviewed including the possibility of increasing the flow of freshwater sources to the Dead Sea by limiting diversion from the River Jordan and promoting public and private water conservation.

Immediate actions are required to save the Dead Sea. If the RDC project will be implemented water would still not be expected to reach the Dead Sea for another 10 years. The Governments therefore need to put in place policy directives that will deal with the current crises and in so doing consider all possible alternatives and solutions.

FoEME calls on the World Bank to support the urgent need to protect the Dead Sea Basin.

World Bank support should be comprehensive to meet all the challenges that the Basin faces and advance a government policy document that would look into all the causes for present unsustainable practices and all their possible solutions. Measures should include short and long term planning considerations both national and regional. Planning should address all management elements and should include measures to improve the efficiency of the current water infrastructure in the region. Planning should investigate the current water uses and decide if these uses at present levels are sustainable. Civil society groups must be fully involved in all stages of this process and where relevant independent third party experts should conduct assessments and evaluations.

Friends of the Earth Middle East is the only regional organization in the Middle East that brings Jordanian, Israeli and Palestinian environmentalists together for the promotion of sustainable development. Friends of the Earth Middle East have offices in Amman, Bethlehem and Tel-Aviv.

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