Developing a master plan for Lake Urmia: Challenges and perspectives

The history of the Dead Sea and its present state

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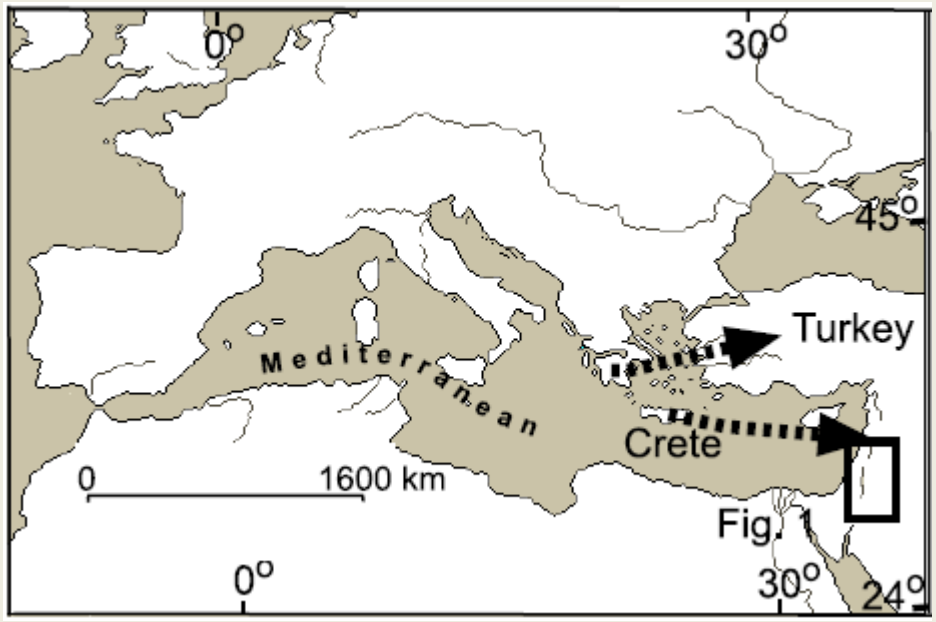
Outline

- introduction
- importance
- the Dead Sea disaster
- rescue plans
- risks

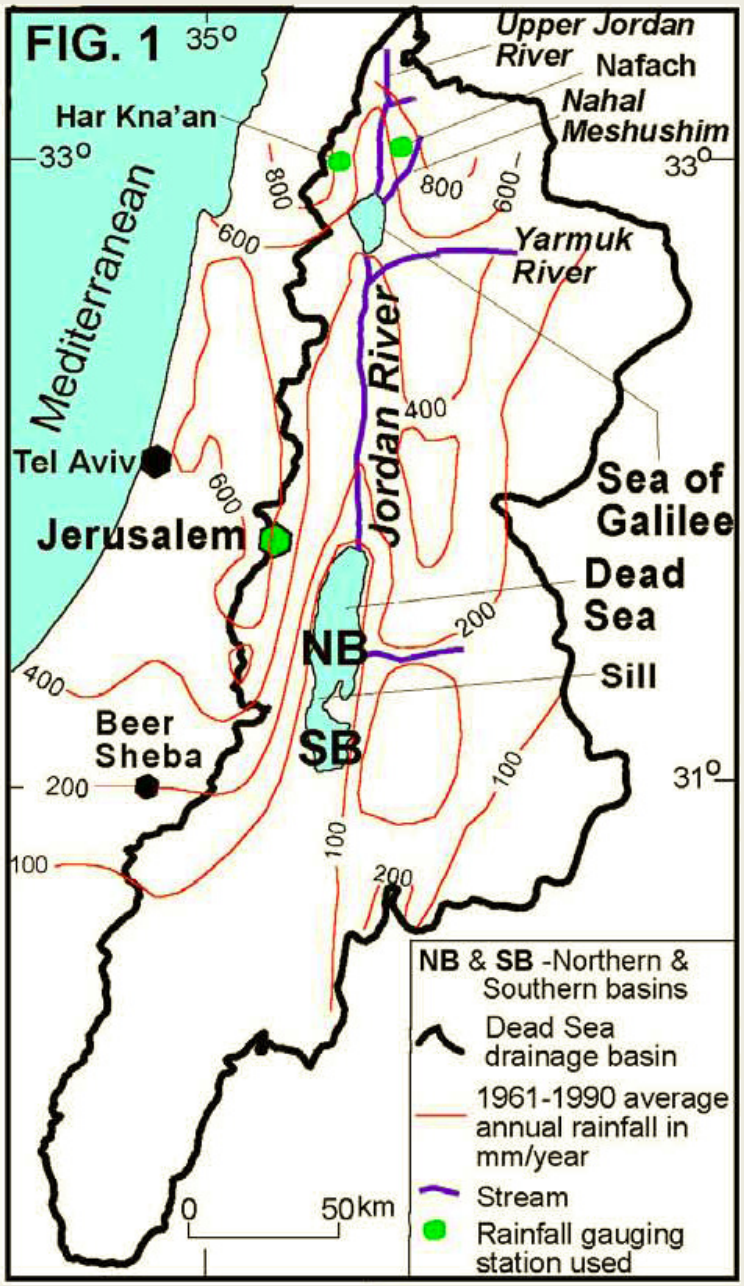
Introduction

Climate

P_{ann}	~70 mm
T_{ann}	23 °C
T_{Jan}	15 °C
T_{Juli}	31 °C (data: Arik Rosenfeld)



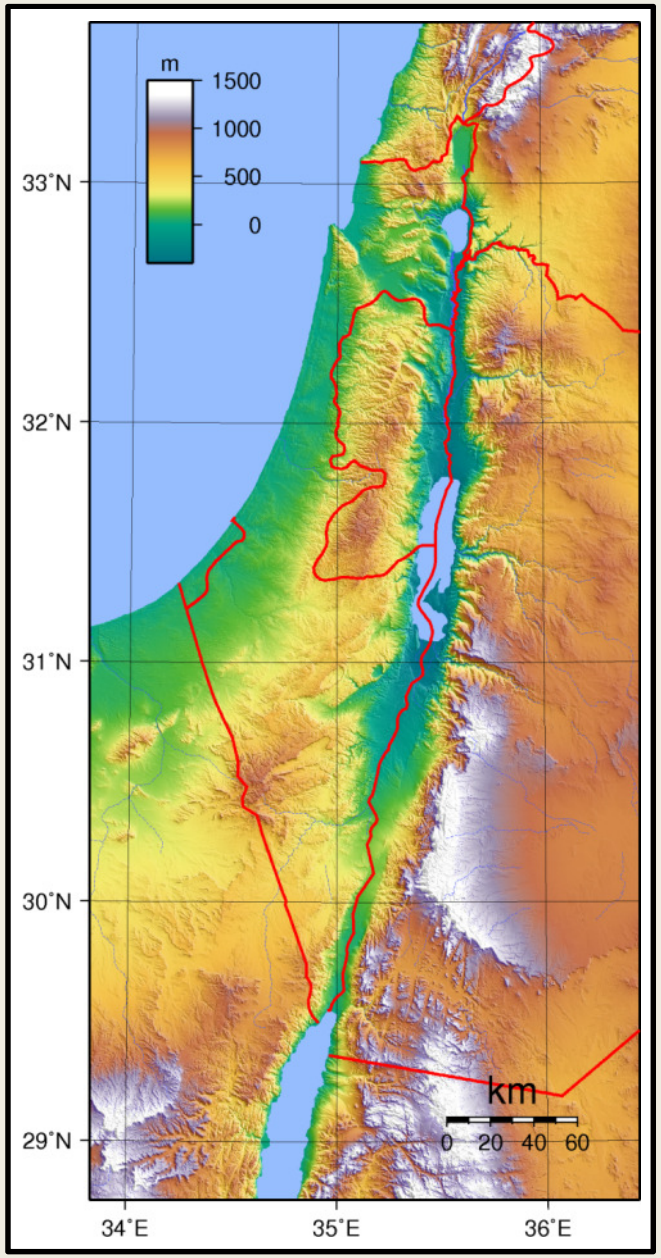
Enzel et al., 2003, Quaternary Research



Introduction

Topography, limnology

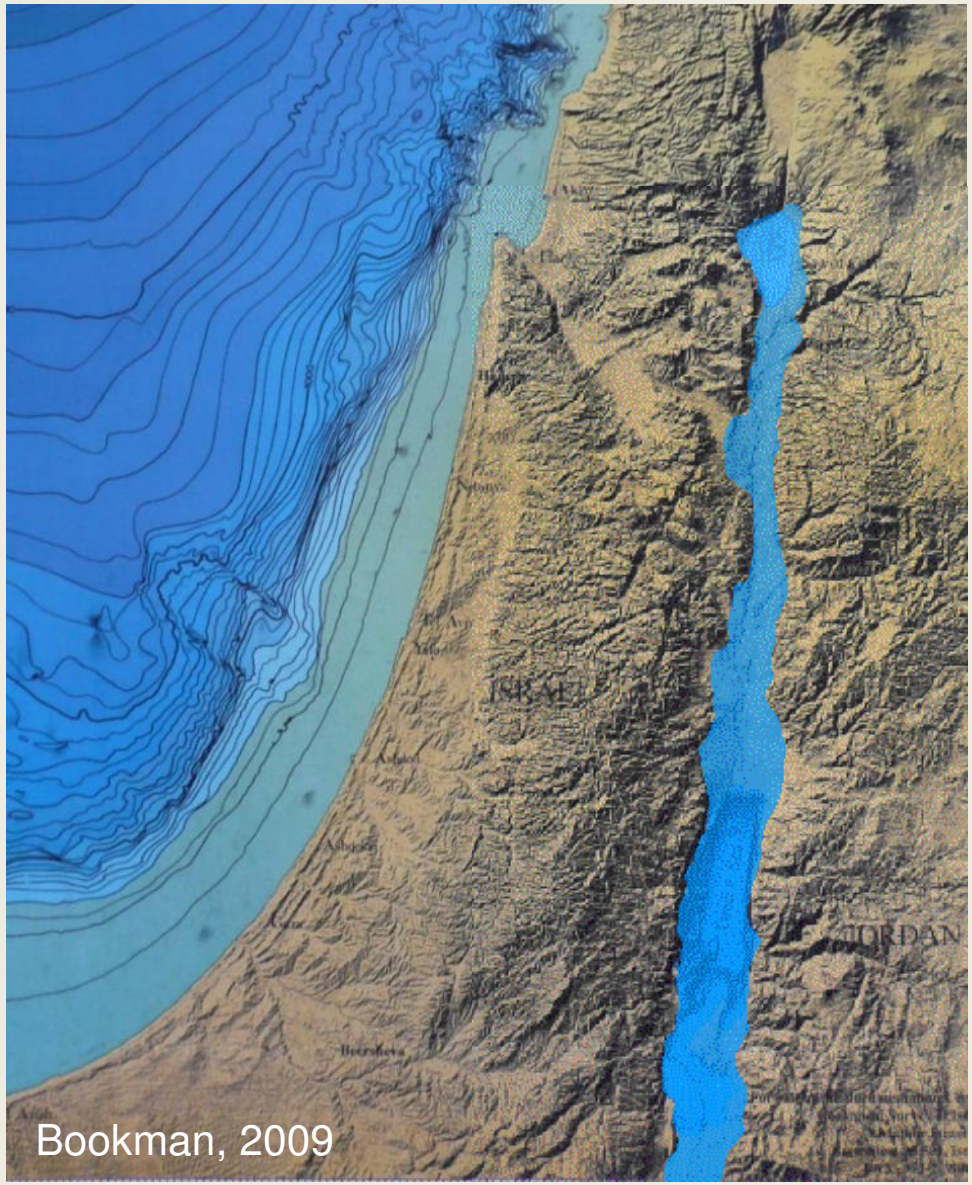
catchment area	43.000 km²
inflows:	Jordan & Yarmuk
surface area	630 km²
altitude	-424 m
max. depth	377 m
salinity	~340 ‰
water type	Mg-Na-Cl



Geological Survey of Israel, 2008

Introduction

Short history



Bookman, 2009

Importance

Salt industry

Space Shuttle, NASA, 2001

Importance

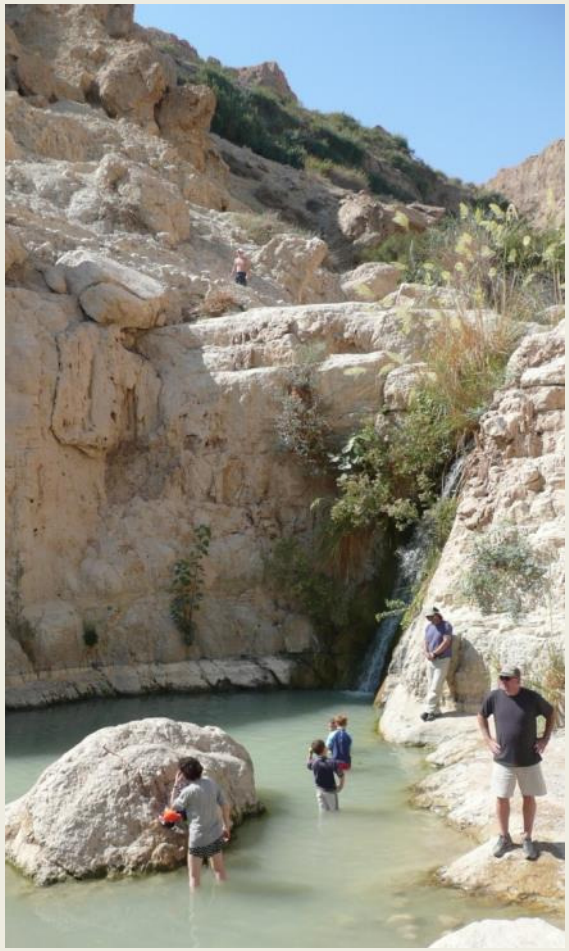
Tourism industry - recreation

Importance

Tourism industry - recreation

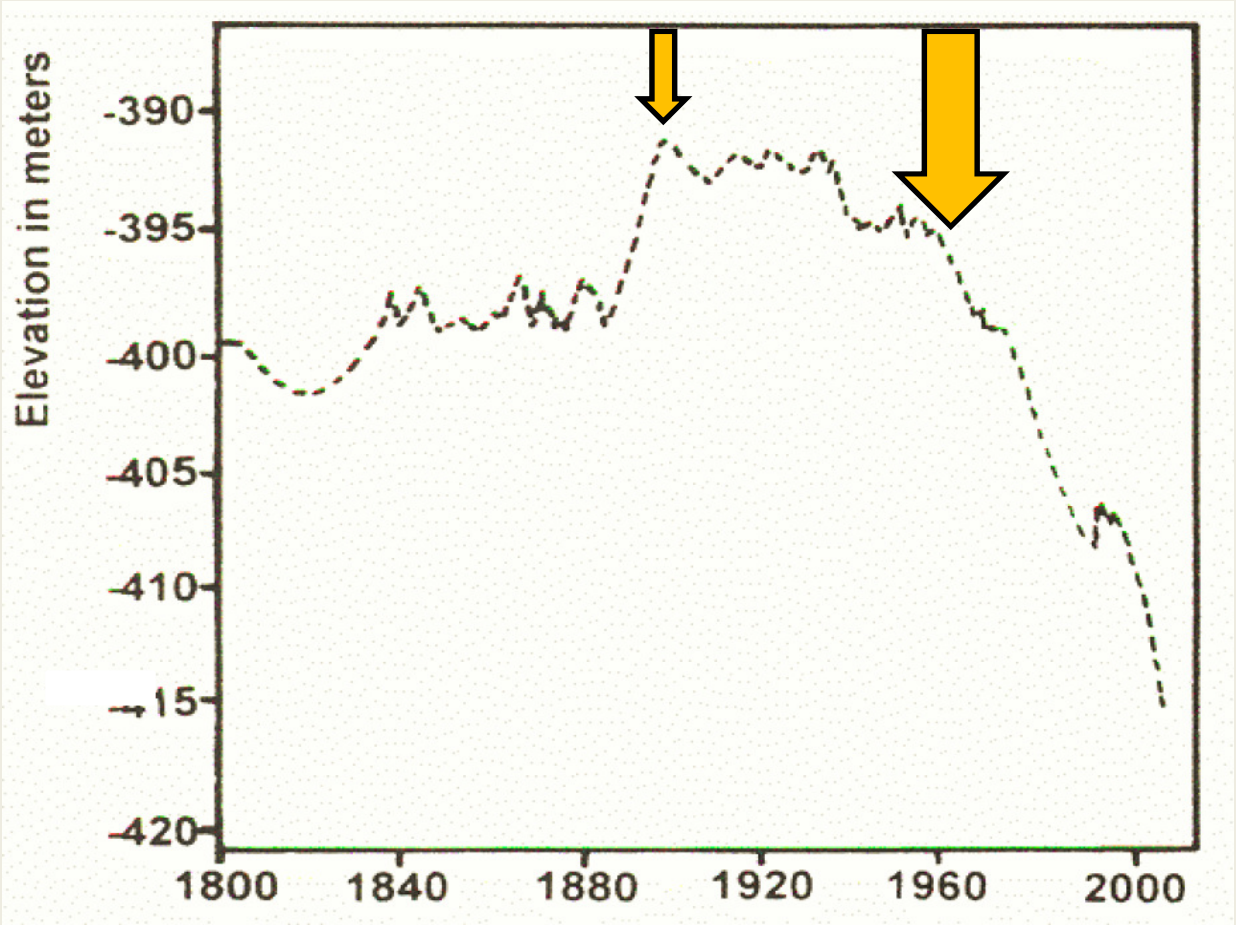
Importance

Tourism industry - recreation



the Dead Sea disaster

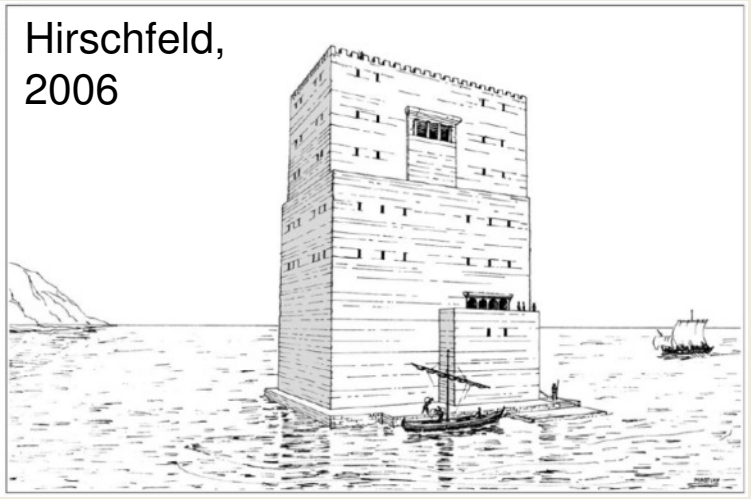
lake level drop since 1960s



Gavrieli & Bein, 2006, GSI Report

the Dead Sea disaster

the Dead Sea disaster



Rugum El Bahr, 1857
Frith, 1858

Rugum El Bahr, 1887
Thevoz, 1888

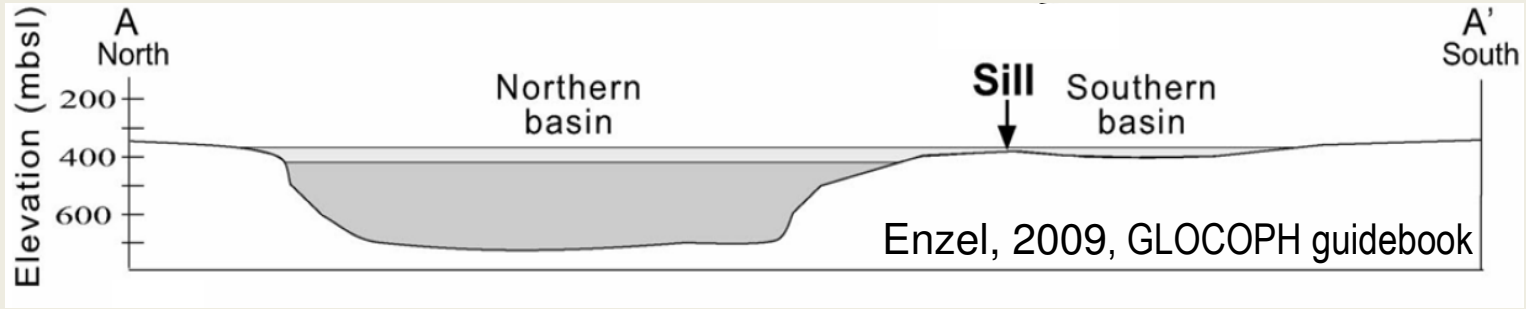
the Dead Sea disaster

King Abdullah Canal, Jordan

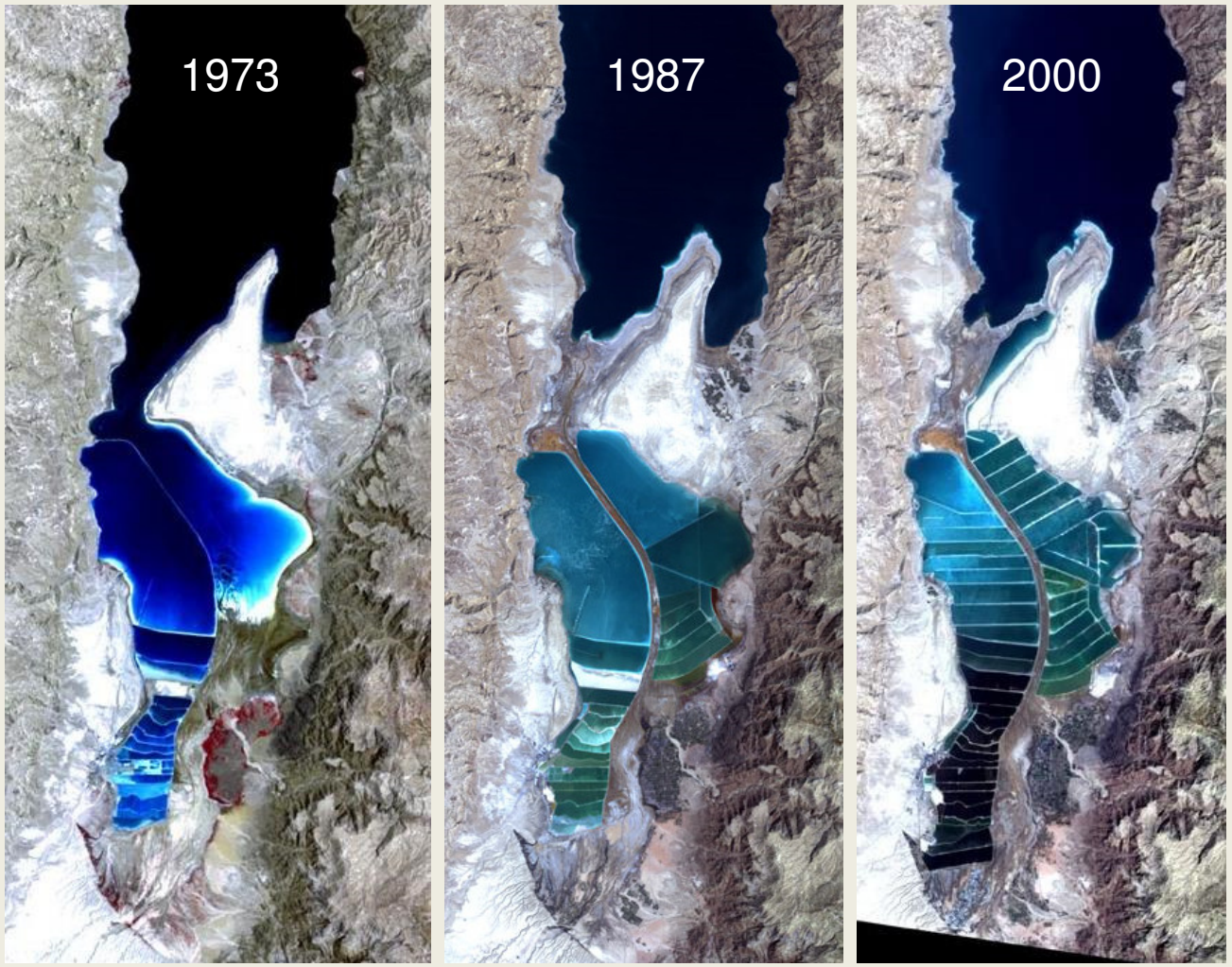
water-technology.net

PASSIA, 1996

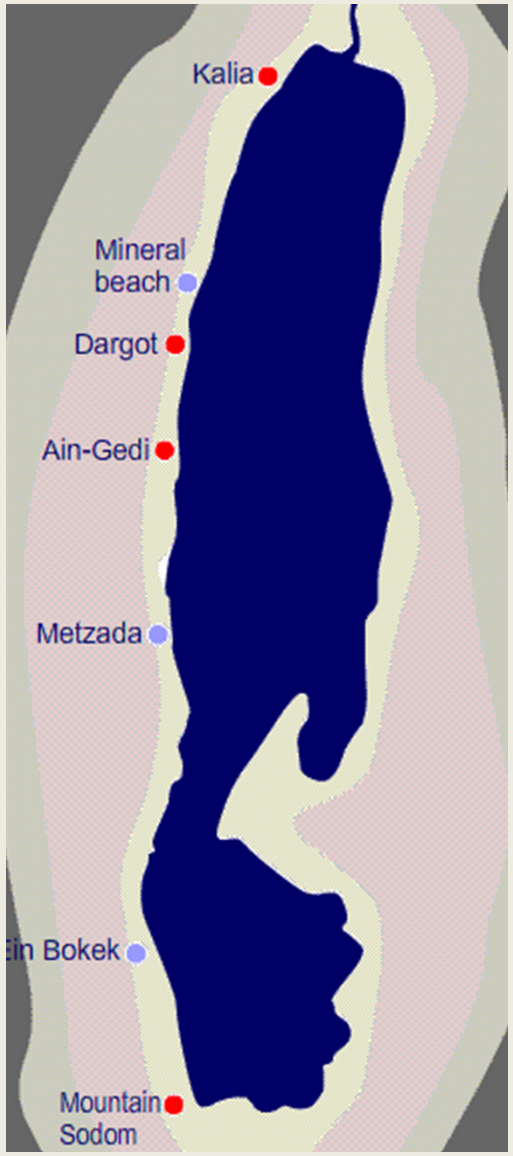
the Dead Sea disaster



the Dead Sea disaster

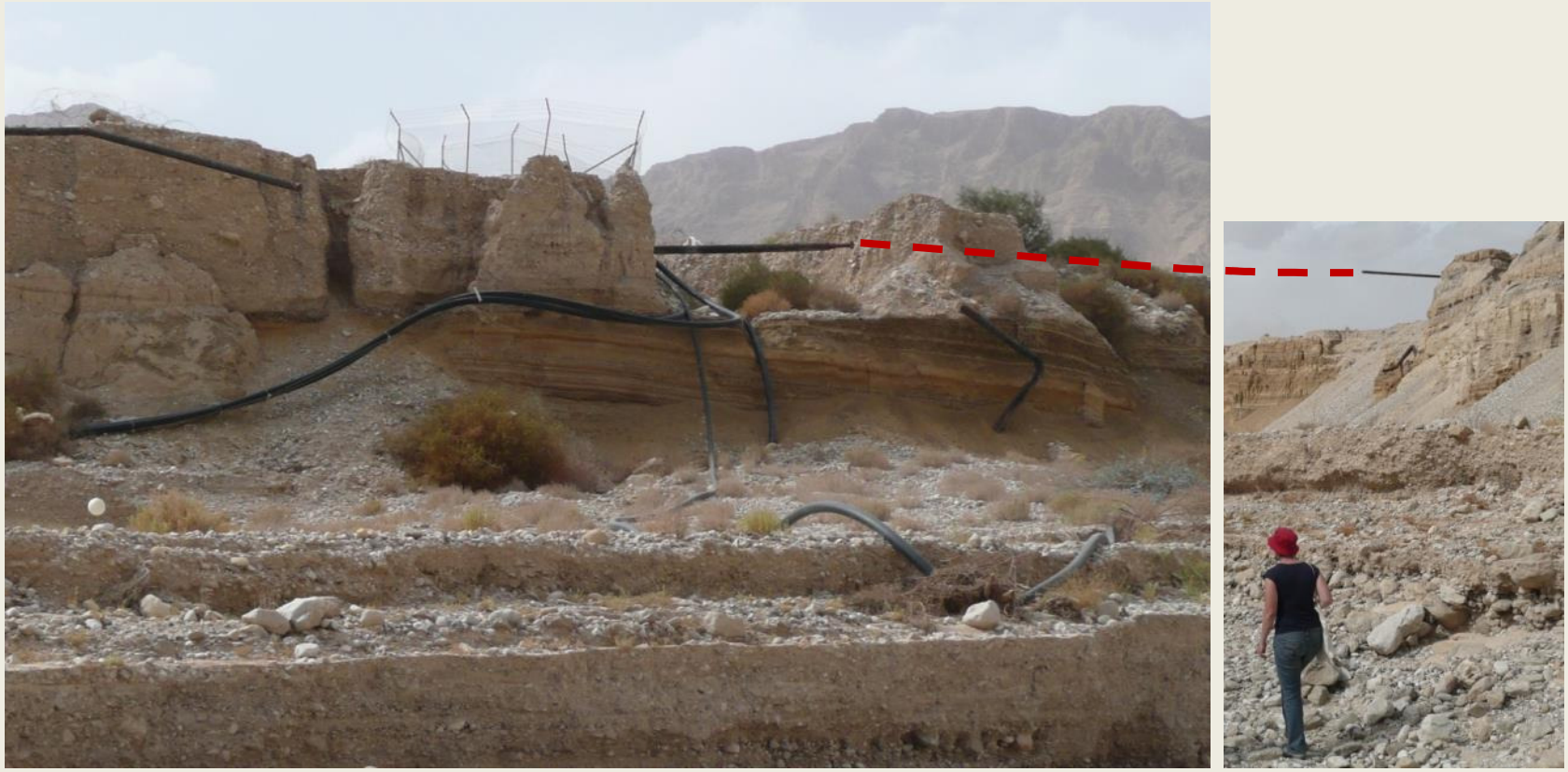


Avraham, GSI Report 2004



commons.wikimedia.org

the Dead Sea disaster



Nahal Darga, 2009

the Dead Sea disaster

Nahal Arugot, 2001

Photo: Yuval Bartov

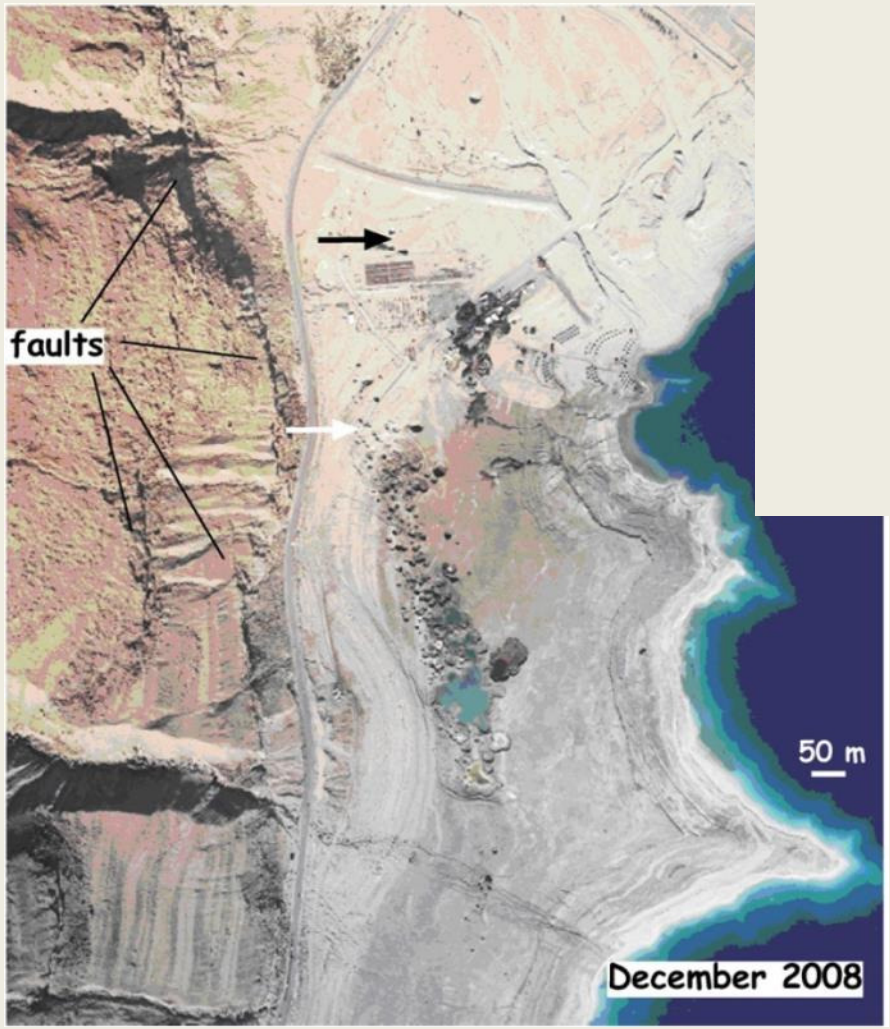
Nahal Darga, 2009

the Dead Sea disaster

Mineral Beach

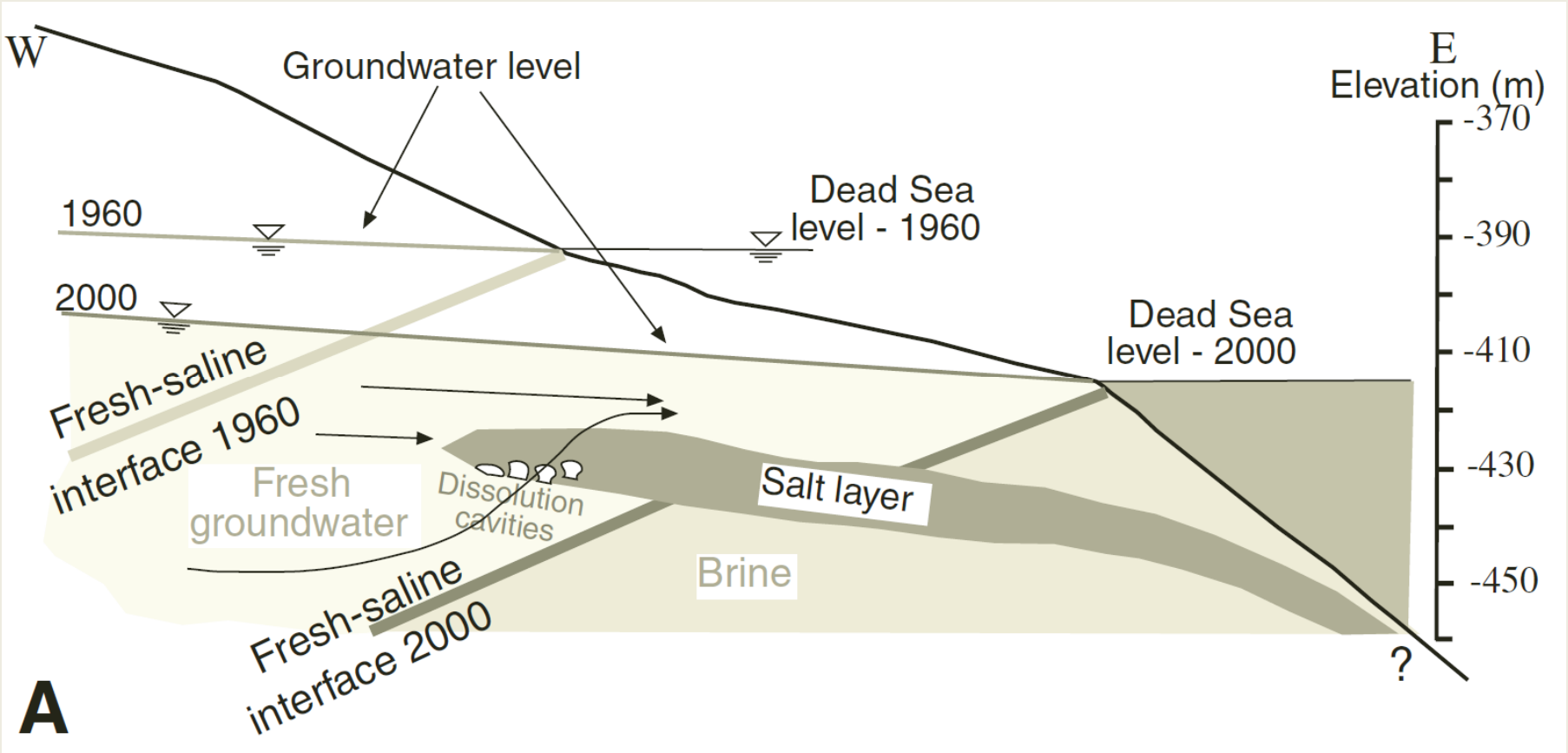
2009

the Dead Sea disaster



Yichieli, 2009, GLOCOPH guidebook

the Dead Sea disaster



Yichieli et al., 2006, GSAB

the Dead Sea disaster

Hotel in Neve Zohar

http://www.hotels.com/hotels/TLV_NIRV

- groundwater loss
- deep erosion
- sinkholes
- unstable shores

Wadi Arugot

the Dead Sea disaster

WASSERMANGEL FÖRDERT TAUSENDE TIEFE KRATER HERVOR

Das Tote Meer stirbt 24.06.2009

Bild.de

GEOLOGY

Will the Dead Sea die?

Geology August 1998, v. 26

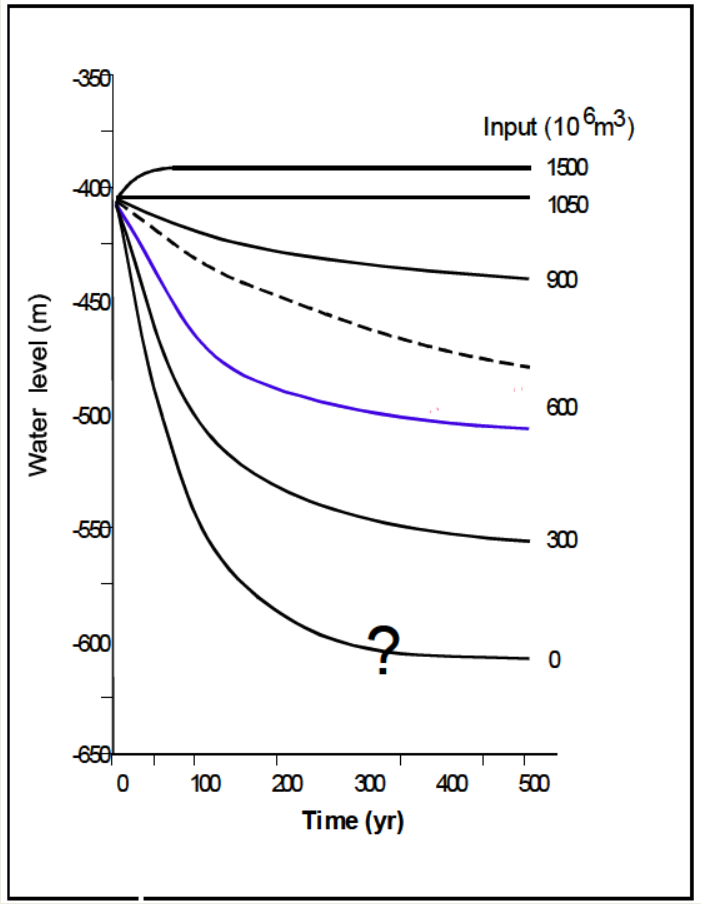
Das Tote Meer stirbt

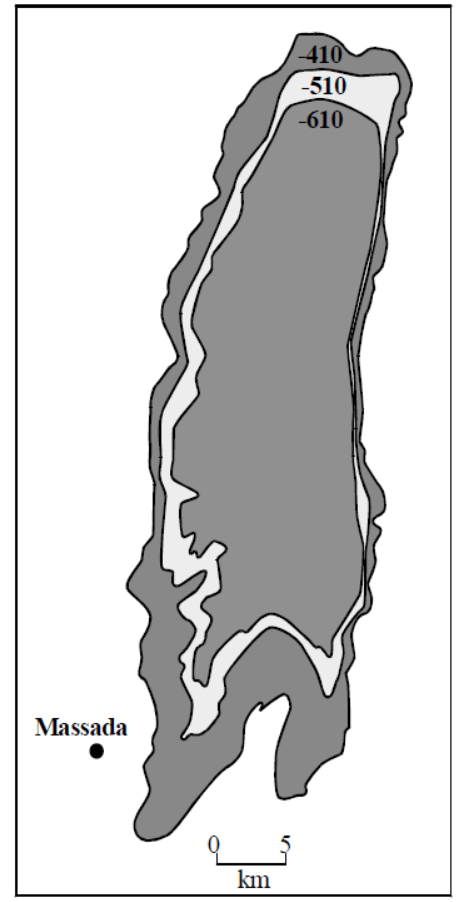
Ein Man-made Desaster

05.07.2007

Spektrum Akademischer Verlag

the Dead Sea disaster





Gavrieli & Bein, 2006, GSI Report

the Dead Sea disaster

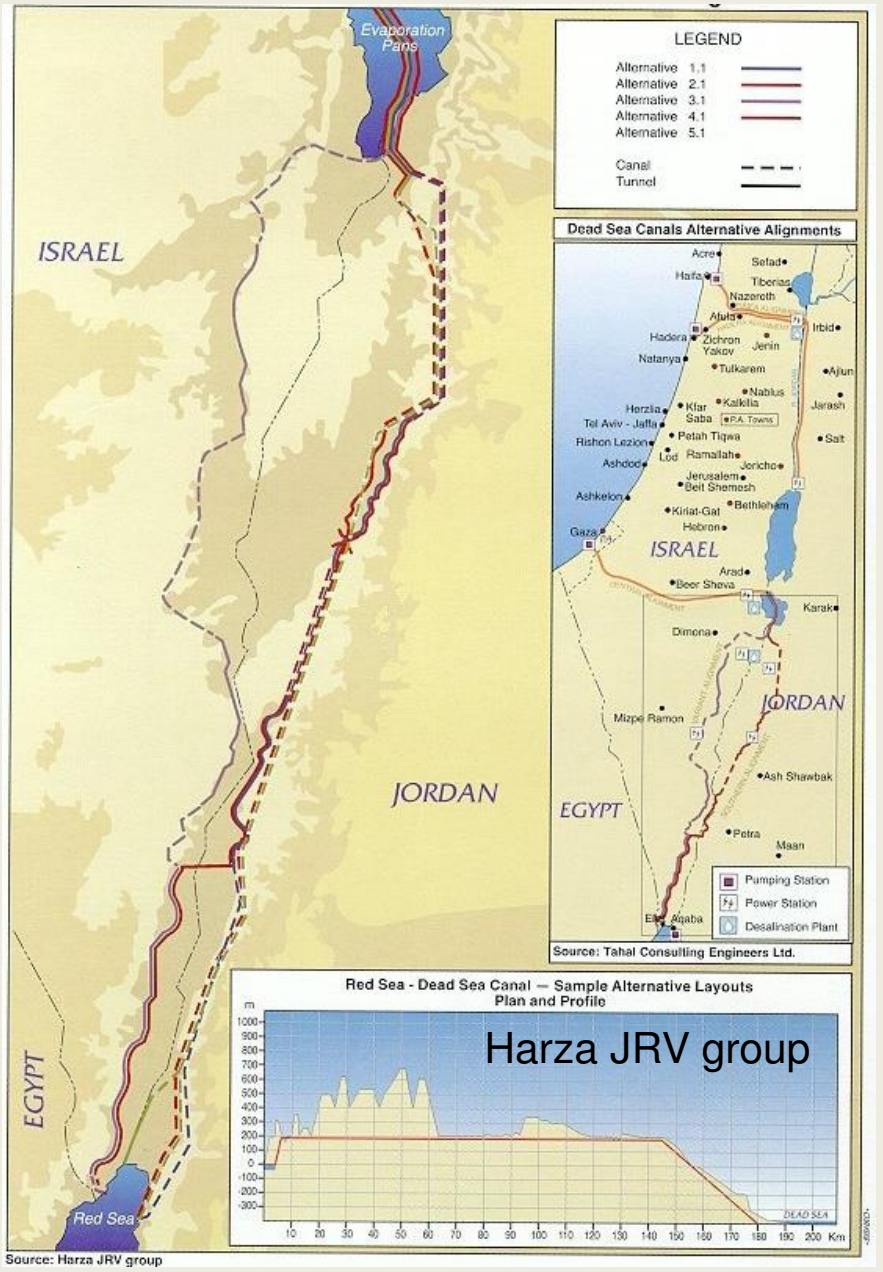
Rescue plans

(1) Red-Dead Canal

Frisches Wasser für das Tote Meer

Berliner Zeitung 2002 » 03. Dezember

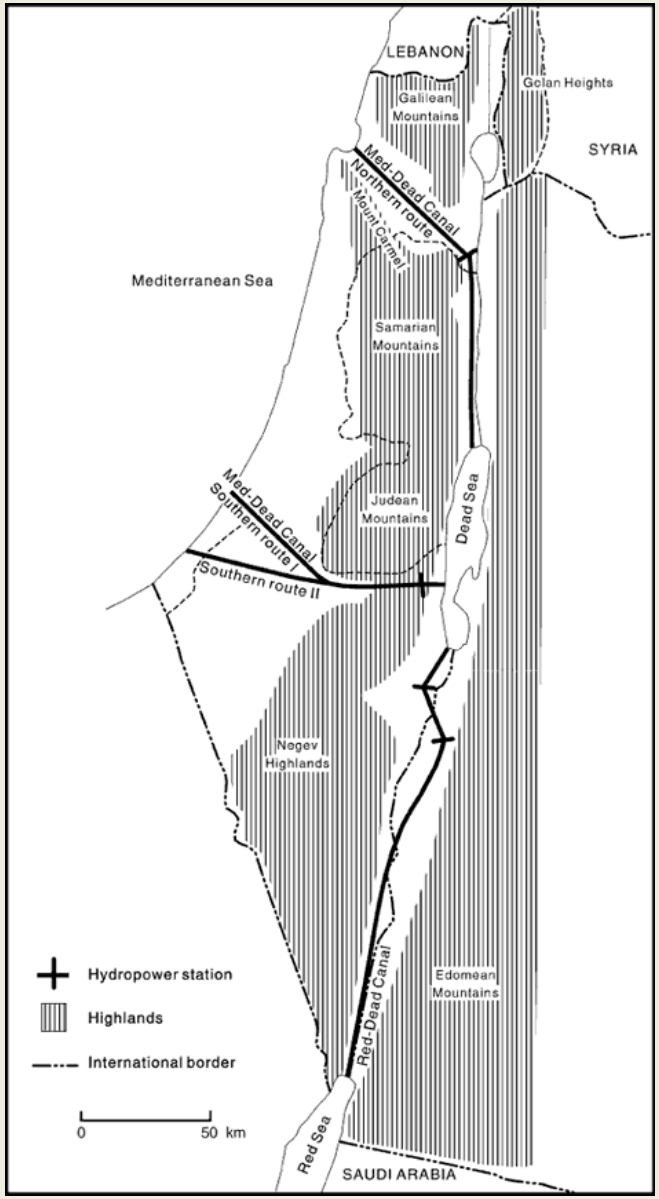
Arava Valley



Rescue plans

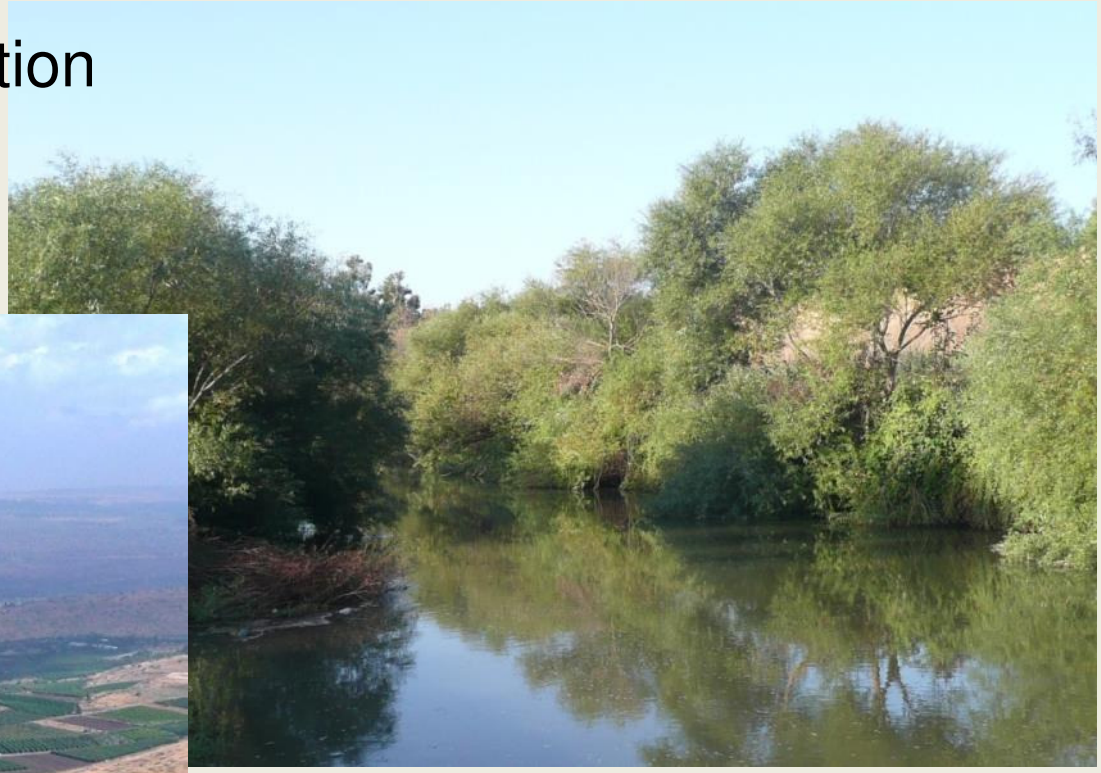
(2) Med-Dead Canal

Mt. Carmel (1890-1900)
www.old-picture.com



Rescue plans

(3) Jordan River reactivation



Jordan River N of Lake Kinneret

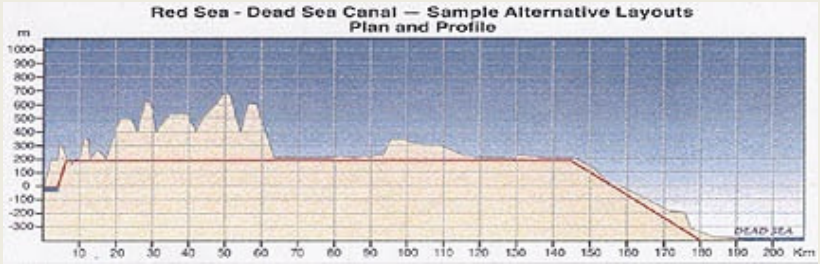
Lake Kinneret (Jordan River inflow)

Rescue plans

likely option: Red-Dead Canal (the Peace Conduit)

construction measures:

- pumping station (Δh=125 m)
- channel
- water power station
- desalination plant



Harza JRV group

Risks

Implications for coral reefs in Gulf of Aqaba?

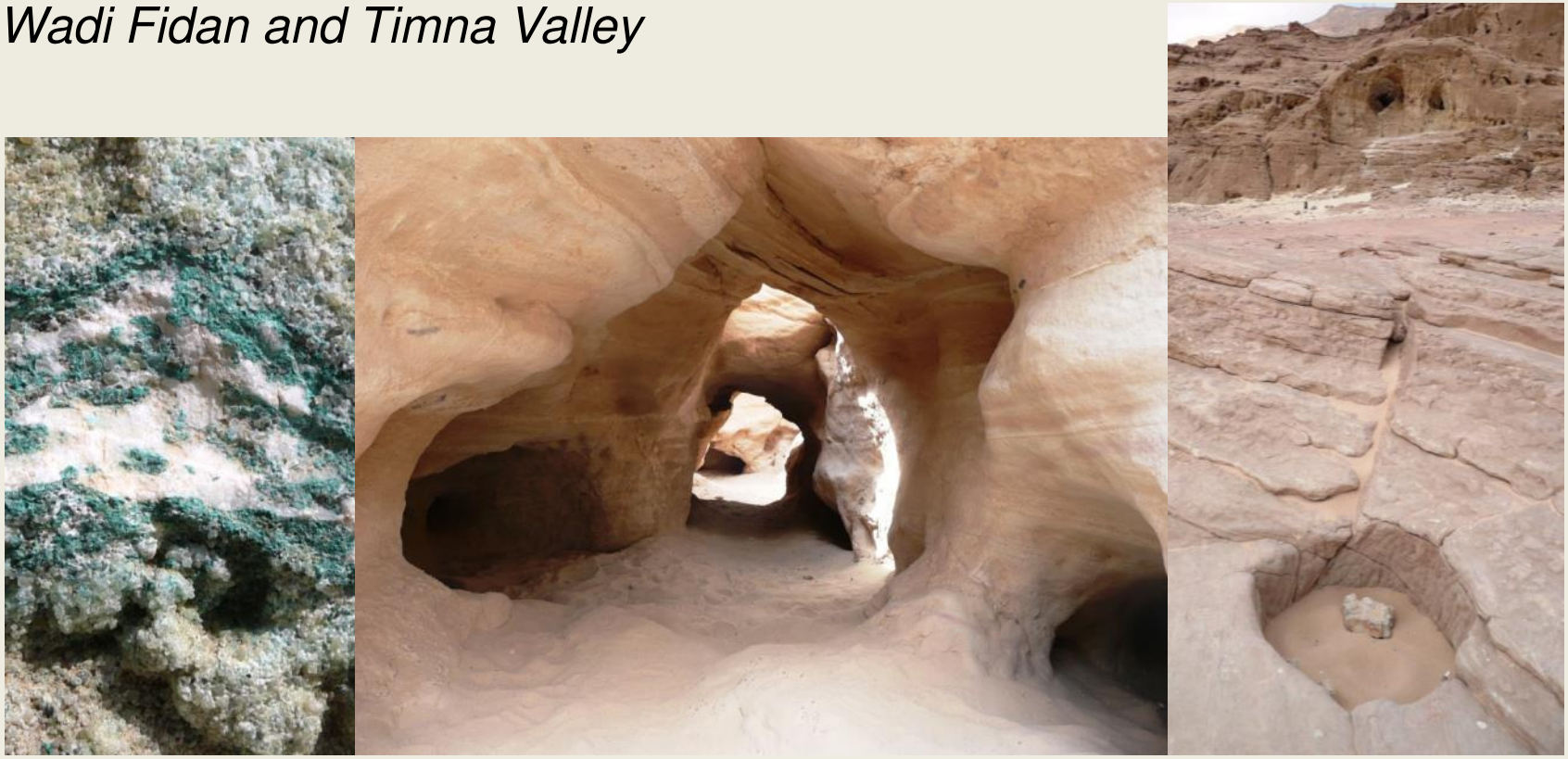
Risks

Salinization of freshwater resources in Wadi Araba

Risks

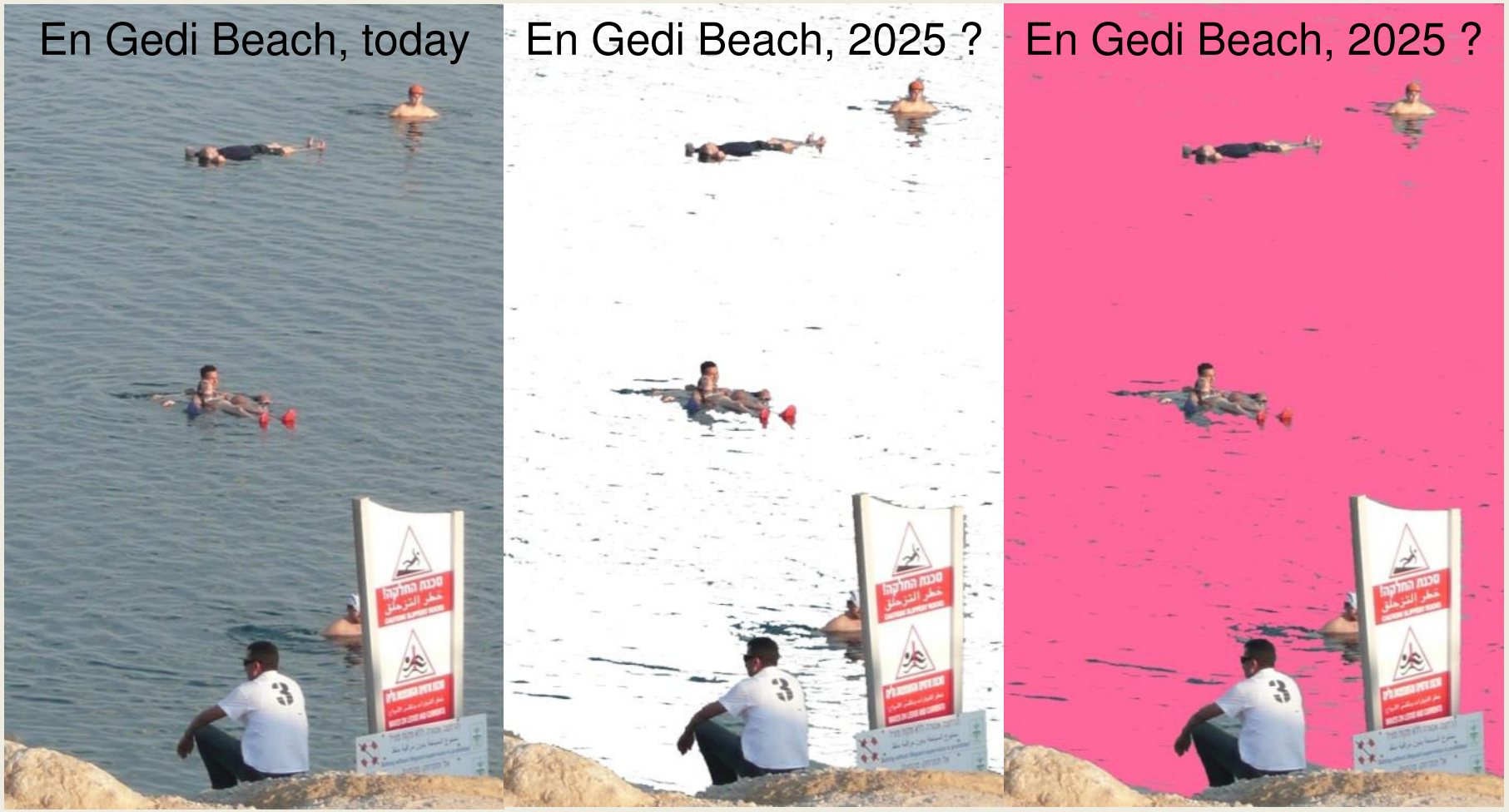
Derogation of world-class archaeological sites in Wadi Araba

Wadi Fidan and Timna Valley



Risks

Change of water chemistry, salt precipitation, and microbiology



Recommendation