

## IAH network on “Coastal aquifer dynamics and coastal zone management” QUESTIONNAIRE

IAH national committees, IAH members and non members from all around the world involved in SWI and SGD research and management are kindly asked to fill in the questionnaire in this page with as many details as possible.  
A world database will be set up and made available, with basic coastal aquifer main characteristics.  
We expect to gather standard and comparable information on the knowledge level and hopefully the state of the art of the research on SWI and SGD, and coastal aquifer management methods adopted around the world.

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|-----|---|--|
| 1)  | Location of aquifer (country, more specific location):  | Israel   |
| 2)  | Reported by:  | Yoseph Yechieli  |
| 3)  | Type of medium (karst, porous, fracture)  | porous   |
| 4)  | Type of aquifer (phreatic or confined)  | The aquifer is divided to several sub-aquifers, the upper of which is phreatic and the lower sub-aquifers (~3 units) are confined (see attached schematic  |
| 5)  | Main lithology - (e.g. gravel, sand and clay)   | sand, calcareous sandstone (Kurkar) , sub-aquifer are separated by clay layers   |
| 6)  | Hydrochemistry: fresh or saline   | fresh groundwater - major anions are Cl and HCO <sub>3</sub> and cations are Na and Ca, brackish and saline groundwater - major anion is Cl, major cation is Na  |
| 7)  | Saltwater intrusion: lateral from sea or lakes - upconing   | seawater intrusion to a distance of 1-2 kms in some parts and less in others. Upconing occurred in the when extreme over-pumping was done. The situation is better now since pumping was reduced   |
| 8)  | Aquifer geometry: hydraulic characteristics   | length of ~120 kms, width of 7-20 kms  |
| 9)  | Aquifer parameters: storage - annual water pumping - (in MCMA - millions cubic meters, annually)  | pumping rate is ~ 300 MCMA, storage in the aquifer is ~ 20,000,000,000 MCM   |
| 10) | Depth of aquifer (water level and bottom) - water level 5- 30 m - aquifer depth - 50-200 m  | depth in most parts of the aquifer is 5 to 40 to the water table and 50-200 to the bottom of the aquifer   |
| 11) | Major chemistry (anions - ?; Cations - ?):  | major anion brackish and saline water is Cl (minor SO <sub>4</sub> , HCO <sub>3</sub> , Br), major cations are Na, Mg, Ca, K   |
| 12) | Major salinity sources:   | near the coast mostly seawater intrusion, away from the coast industrial and agricultural sources and also saline water from adjacent aquifers   |
| 13) | Population:   |  |
| 14) | Aquifer status: special features - e.g. thermal springs, major faults,...   |  |
| 15) | Investigation methods - e.g. water level measurements, EC (electrical conductivity profiles), TDEM (geophysical),                                       | water level measurement, EC profiles, TDEM, chemical and isotopic analysis, numerical simulation, laboratory chemical experiments, pumping test  |
| 16) | Numerical hydrological modeling, chemical and isotopic methods, age determination, IR survey, seepage meters (for Submarine Groundwater Discharge, SGD) | numerical modeling was conducted in several parts of the aquifers, including for examination of the effect of the expected sea level rise. Chemical and isotopic methods were employed to determine the source of salinity and pollutions. Age determination were conducted with radiocarbon and tritium.            |
| 17) | Monitoring methods applied and duration - water level measurements, EC (electrical conductivity profiles - seasonal)                                    | water level measurements are conducted monthly in many monitoring wells and also continuous monitoring is done in representative wells. EC profiles are conducted 2-3 time a year in order to see the seasonal changes. TDEM were conducted several times and will possibly be conducted again as a monitoring tools |
| 18) | Management methods:   | The aquifer is divided to coastal strips with width of several kms, for monitoring and and reporting of management information, such as pumping from each cell   |
| 19) | Aquifer management actions:   | artificial recharge, including treated sewage water, from adjacent aquifer, from the sea of galilee. Coastal collectors (pumping with small wells very near the shore) are employed to control SGD and seawater intrusion  |
| 20) | Identification of existing or potential problems:   |  |
| 21) | Annexes:  | references list attached   |
| 22) | Observations:   | precipitation of ~500 mm/year, recharge coefficient is ~ 0.3   |