Electro-kinetic Fences against Sea Water Intrusion

2017 - 2021

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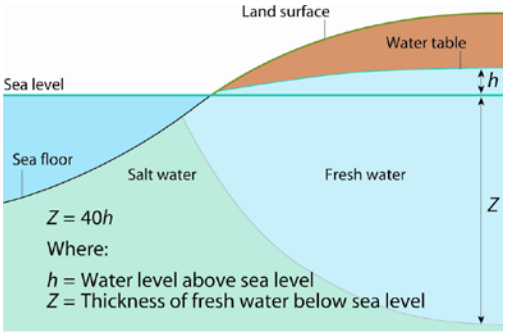
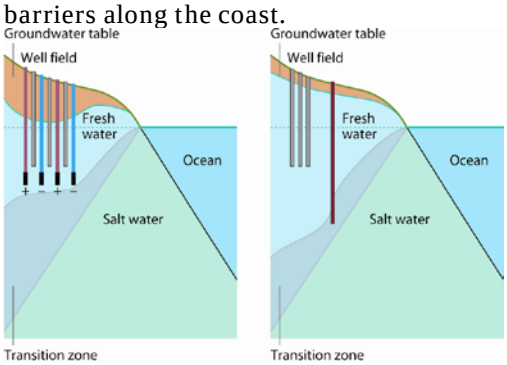
Motivation

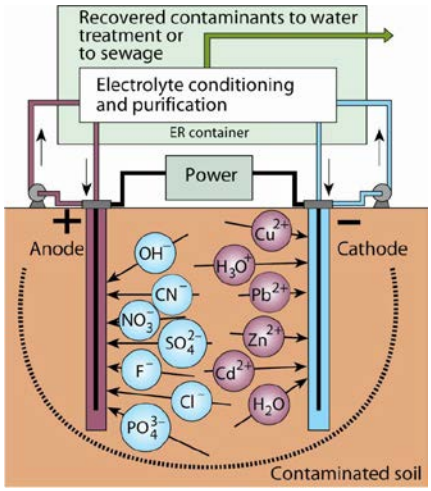


The Ghyben-Herzberg Relation

One of the major concerns today in fresh water supply along coastal areas is seawater intrusion into fresh water aquifers mainly as a result of over pumping or salt-water intrusion from the sea. There are several more or less effective methods to overcome this problem, such as recharge basins, or barrier wells to pump out salt water and recharge a fresh water gradient towards the sea. Rising cost of water and maintenance and uncertainty of long-term potable water availability force authorities to find other ways to deal with this problem. An innovative solution is the creation of electro-kinetic barriers along the coast.



Horizontal/vertical electro-kinetic fence stops sea water intrusion by capturing and removing chloride (© Lambda Consult, 2013)



Schematic field setup of electro-reclamation (© Lambda Consult, 2013)

Technological challenge

Computer simulations, assuming different boundary conditions, indicate that electro-kinetic fencing can be a viable and interesting alternative, especially when the electricity to activate the fence comes from sustainable energy sources such as wind energy and solar power. The objective of this study is to validate the computer simulations and to assess the ecological and economic feasibility of electro-kinetic fences to abate salt water intrusion fresh water aquafers.

This study is carried out in cooperation with Lambda Consult

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