Implementing Groundwater Strategy: Visualizing and Communicating the Priorities through GIS

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Background/Objectives. In Denmark when it isn't possible to link a contamination to a recent or ongoing industry or process the authorities investigate and remediate contaminated sites. This is done in order to protect people, surface water and groundwater. The drinking water supply in Denmark is based on clean groundwater which only undergoes a simple processing (aeration and filtration) and therefore contaminated sites pose a potential threat to drinking water supply.

Central Denmark Region (CDR) - one of five regions in Denmark – has developed a GIS-based tool in order to make the political accepted groundwater-strategy applicable when pri-oritizing the work order between around two thousand contaminated sites. Apart from the in-house work order the GIS-tool will be used to communicate the yearly activity list to local municipalities which means that the process will be both transparent and easier to understand by the various stakeholders.

Approach/Activities. The accepted groundwater strategy consists of 10 different principles of which six have a geographic component. All the principles have a principle-weight which has been defined in collaboration with the stakeholders. Four out of 10 are non-geographic principles which define the contaminants or industries considered by the strategy. These are the frame within which the geographic principles are used. The geographic principles are:

1. Areas where it is difficult to find new aquifers with clean groundwater
2. Areas with increasing need for drinking water in the future
3. Areas with vulnerable groundwater aquifers and poor retention capacity
4. Areas with unfavorable conditions for decomposition
5. Areas with few soil and groundwater contaminations
6. Areas where local initiatives are done to protect the groundwater

As of now principle 1, 2 and 5 are implemented in the GIS-tool via raster maps that defines the score in every 1000 m squared cells covering the entire CDR. Principle 6 is handled in the daily collaboration between the municipalities and CDR when local groundwater protection plans are decided or when other local initiatives are carried out in order to make an extra effort on groundwater protection. Principle 3 and 4 currently awaits a national initiative on risk assessment screening of contaminated sites. The produced raster maps are combined to produce an integrated score raster which is applied to every contaminated site in the CDR.

Results/Lessons Learned. Before implementation of the groundwater strategy and development of the GIS-tool the creation of the yearly activity list was a 'black-box' solution to the local stakeholders. Now with the developed GIS-tool the CDR is able to make a documented and transparent decision when it comes to prioritizing between many thousand contaminated sites.

As the dynamic principles of the GIS tool are based on simple data sources which are pro-duced in the daily workflow in the CDR, updating of the system is an easy task to the local GIS-administrator. This means that when the work on next year's activity lists is carried out it is always done on an updated basis.