GROUNDWATER QUALITY ANALYSIS REPORT

Kampong Cham - Kampong Siem - Kaoh Tontuem (12F)

Kaoh Tontuem is located in the district of Kampong Siem. The population of this commune is approximately 3323 (2004). Groundwater sample collection occurred in June 2008 and consisted of the sampling of 5 tube wells throughout the commune. The attached figure presents the location of Kaoh Tontuem within Kampong Cham as well as groundwater sample locations and exceedances of health-impacting contaminants (when applicable).

Groundwater Quality Rating

The groundwater quality rating for Kaoh Tontuem is 12F. Therefore, the general safety of deep aquifer groundwater is extremely poor and the aesthetic quality of the water is poor, according to the contaminants measured and samples collected. The following two sections describe all major health and aesthetic contaminants that exceeded drinking water standards in at least one sample within the commune.

Contaminants of Potential Concern – Health

Arsenic - Elevated concentrations of Arsenic were observed within the commune. The estimated probability of encountering unacceptable concentrations of Arsenic (>50 ppb) in tube wells is 82%, based on the observed data. Long-term (5 to 10 year) exposure to elevated concentrations of Arsenic can cause arsenicosis (debilitating skin disease), increased risks of contracting cancer, as well as other negative health impacts.

Manganese - Elevated concentrations of Manganese were observed within the commune. The estimated probability of encountering unacceptable concentrations of Manganese (>0.4 mg/L) in tube wells is 73%, based on the observed data. Exposure to elevated concentrations of Manganese can cause neurological disorders. Aeration allows oxygen to enter the water and react with Manganese to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Manganese in water but follow-up testing is recommended to ensure water quality standards are met.

Nitrate - Elevated concentrations of Nitrate were observed within the commune. The estimated probability of encountering unacceptable concentrations of Nitrate (>50 mg/L)

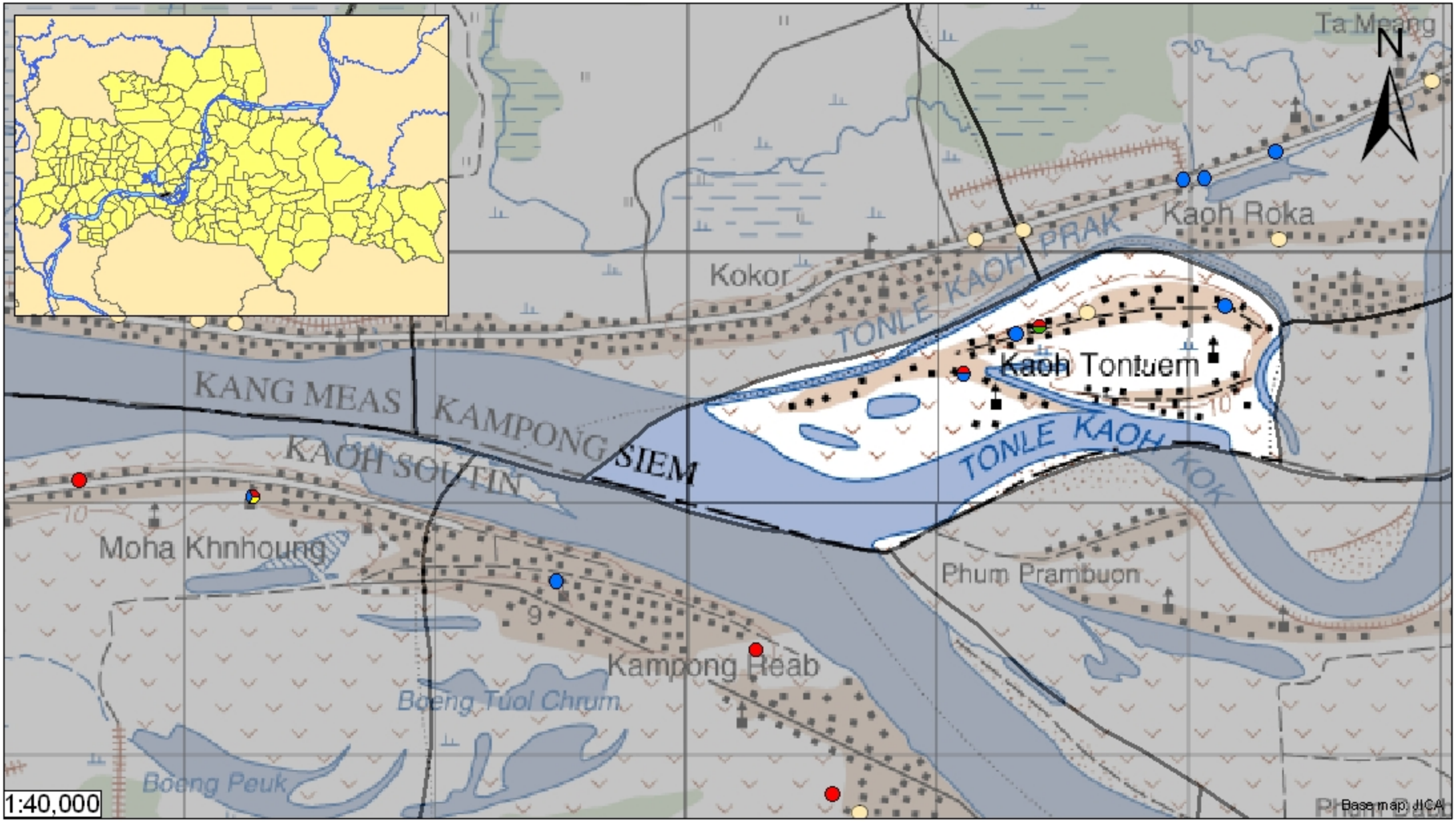
in tube wells is 12%, based on the observed data. Short-term exposure to elevated concentrations can cause blue-baby syndrome in infants.

Contaminants of Potential Concern – Aesthetic

Iron - Elevated concentrations of Iron were observed within the commune. The estimated probability of encountering potentially unacceptable concentrations of Iron (>1 mg/L) in tube wells is 91%, based on the observed data. At elevated concentrations, Iron causes water to be cloudy and unpleasant to drink. An odor may also be encountered at high concentrations. Iron can also stain laundry, food (can cause discoloration of cooked rice), and leave deposits. Aeration allows oxygen to enter the water and react with Iron to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Iron in water but follow-up testing is recommended to ensure water quality standards are met.

Manganese - Elevated concentrations of Manganese were observed within the commune. The estimated probability of encountering unacceptable concentrations of Manganese (>0.4 mg/L) in tube wells is approximately 73%, based on the observed data. At elevated concentrations, Manganese causes water to be cloudy and unpleasant to drink. Manganese can also stain laundry, food (can cause discoloration of cooked rice), and leave deposits. Aeration allows oxygen to enter the water and react with Manganese to form a compound which is insoluble in water. The newly formed solids will slowly settle to the bottom or can be removed more rapidly by filtration. Performing these procedures may reduce the concentration of Manganese in water but follow-up testing is recommended to ensure water quality standards are met.

Turbidity - Elevated levels of Turbidity were observed within the commune. The estimated probability of encountering potentially unacceptable levels of Turbidity (>20 ntu) in tube wells is 101%, based on the observed data. Turbid or cloudy water appears unpleasant to the eye and is more likely have an unpleasant taste or odor. Turbidity can be reduced by filtration.



No Exceedance

Arsenic

Manganese

Fluoride

Nitrate

Commune Boundary

Provincial Boundary

Locations exceeding the Cambodian water quality standards for major health-impacting contaminants have been colour-coded and arranged such that they do not overlap.

Tube Well Sample Locations and Health-Based Exceedances

Kaoh Tontuem - Kampong Siem - Kampong Cham - Cambodia

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